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ABSTRACTS OF TUBERCULOSIS

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Ileocecal Tuberculosis.—The ileocecal region is a point of predilection for tuberculosis; its characteristic symptomatology and pathology are well known, but its surgical significance has been less clearly defined. Three cases are reported: 1. A prison guard, aged 43, with previous history of empyema; eight years ago intense abdominal pain appeared, simulating hepatic colic. The pains appeared abruptly and sharply in the right iliac fossa, giving rise to a sensation of constriction and lasting several minutes. At first physical and radiographic findings were negative, but on a later occasion two distinct masses were felt, one in the right iliac fossa, fluctuating and recurrent with the attacks of pain, and the other in the subhepatic region, persistent, hard and adherent. The first was attributed to intestinal inflation, the second to a tumor, and this was corroborated by radiographic plate, which showed in the first locality a clear space between two bismuth segments and in the latter an irregularity in the region of the ascending colon. The stools were not found to contain blood or tubercle bacilli. The tumor was thought to be neoplastic. At operation, there was found a firm, adherent subhepatic mass extending to the iliac fossa by an enlarged segment of ileum. Thus the extremely dilated segment observed radioscopically was ileum and not cecum, and the mass fixed to the posterior abdominal wall only cecum. Cecum, appendix and several centimetres of ileum were resected, together with lymph nodes, and end-to-end anastomosis of ileum and colon performed. The operation was a complete success. Histological examination clearly showed the tuberculous nature of the lesion, involving chiefly the ileocecal valve and adjacent parts of ileum and cecum. 2. A child, admitted with fever and a hard mass in the right iliac fossa. Blood and tubercle bacilli were present in the stools. There were crises of intense abdominal pain, localizing in the right iliac fossa. Operation showed enteric and and peritoneal tuberculosis with adhesions. Excision of a segment of large intestine was performed. Death occurred in a few days. A tuberculous ileotyphlitis with suppurating foci was found. 3. A young girl of 20 presented a hard, uneven mass in the iliac fossa; at times peristaltic movements were observed; diarrhea alternated with constipation; the stools showed blood. Operation consisted of extensive intestinal resection (55 cm.). The result was at first satisfactory, but later she developed pyloric occlusion and refused operation and was lost sight of. The symptomatology of ileocecal tuberculosis has been well defined. Pain, constipation and sometimes fever are characteristic. It may be confused with cancer. The pain is at first vague and intermittent. Later there are more or less characteristic colicky pains, and finally precise rhythmic pains together with peristaltic contractions. There are two important signs; false ascites with a wave, and intestinal rippling, most clearly heard in the pubic region, which must be distinguished from the sounds obtained over the stomach or a dilated cecum. The evolution of the picture is quite slow. The possibility of surgical intervention depends largely on the mobility of the lesion. Differential diagnosis must be made from appendicitis, pelvic lesions, cancer and actinomycosis. *Etiology and pathology:* This form of tuberculosis is often secondary to pulmonary tuberculosis, but in at least one-third of the cases it is apparently primary. The ileum and especially its terminal portion are sites of election for bacillary lesions. Although it is quite possible to conceive of an intestinal portal of entry even in the absence of pul-

monary tuberculosis, it is believed that the mode of invasion is more often vascular. The anatomic disposition of the arteries of the ileum, cecum and appendix is such as to form a single block or circuit from a common trunk, the ileocecal artery, where bacterial emboli may localize. Experimental work done in collaboration with Esmonet has shown that tubercle bacilli introduced into the various arterial trunks result in lesions localized to the corresponding intestinal segments, proceeding from the deeper tissues to the mucous membranes, which, however, may remain intact in the presence of intense reactions at the periphery. *Treatment:* When the lesion is not removable it is treated like an abscess, by exclusion and drainage together with ileosigmoidostomy; when removable, resection and anastomosis are done; the operative results in the latter case are very satisfactory, and more durable than is usual in pulmonary tuberculosis, unless there are many adhesions which unfortunately are not uncommon. The results should be observed radiographically. When the ileum is implanted into the colon, the latter rotates and descends and forms a sort of cecum. *Conclusions:* 1. Of all forms of intestinal tuberculosis, the ileocecal is one of the most curable, because it is relatively limited and accessible to surgery. 2. The painful symptoms are at first vague, then more definite and accompanied by peristaltic contractions. 3. Diagnosis is often missed and frequently confused with cancer. 4. The presence of blood and tubercle bacilli in the stools is not constant. 5. In most cases invasion seems to occur by the vascular routes from periphery to mucosa. 6. The degree of mobility determines the surgical treatment, whether palliative or curative, simple anastomosis or resection. 7. In certain cases of end-to-end anastomosis the colon drops and a new cecum forms in the right iliac fossa.—*La tuberculose iléo-caecale, M. Loeper, Le Prog. Méd., March 25, 1922, no. 12, p. 135.*

Tuberculosis of Hip.—Next to tuberculosis of the spine this is the most frequent bone and joint involvement and is easily overlooked in its early stage when the prognosis is best. Early diagnosis and treatment are of paramount importance. Ninety-two per cent of all cases begin before ten years of age and are always secondary to a tuberculous focus elsewhere, usually in the bronchial or mesentric nodes. A history of previous injury to the infected joint, often slight, can often be elicited. The tubercle bacilli lodge most frequently in bone marrow of the epiphysis, and next in the synovial lining of the joint, since these structures are rich in endothelial and lymphoid cells which are essential to the tubercle. Elsewhere in bone the bacteria seldom survive. This explains the low incidence of tuberculous arthritis in adults, whose bones do not show the red marrow present at the epiphysis in children. The articulating cartilage seems to resist tuberculosis, and is rarely involved until it is covered by a villous fungoid growth. Primary synovial involvement is more severe, but the tendency to healing is better than when bone is involved. Frequently a serous effusion is present in the joint, even before the arthritis becomes tuberculous, due to a neighboring bone focus. Villous arthritis, with formation of rice bodies but with little or no fluid, results from joint involvement. Cold abscesses may develop, and are favored by sequestral bone; the abscess burrows to the surface, or may heal by encapsulation in fibroid material. Secondary infection, either hematogenous or through the thin skin, or a sinus of a neglected cold abscess, is an undesirable complication. The symptoms are variable, and none can be called cardinal; they include lameness and muscle spasm, pain, frequently referred to inner side of the knee and most severe at night, night cries and lumbar lordosis. Sometimes there is a slight atrophy of the thigh on the affected side, and there is usually a slight evening fever with anorexia and malaise. The X-ray is valueless in the early stage. In a child under ten years, with a demonstrable tuberculous focus or a positive tuberculin test and the above symptoms, it is safe to make a diagnosis of tuberculosis of the hip. In the later stages, when bone and joint involvement are prominent, the prognosis is not good. Here the X-ray shows bone destruction and shadows of cold abscesses. The thigh is fixed in flexion, frequently, in addition, with resulting lordosis. Large superficial veins and thickening of the periarticular structures, abscesses pointing in the thigh or buttock, and enlarged and tender lymph nodes are all evidences of an advanced lesion. Conditions which simulate tuberculosis of the hip must be ruled out. Syphilis, by the Wassermann test and the history, may be eliminated. Perthes' disease is more difficult to differentiate, but the X-ray is helpful; this disease shows a widening of the neck of the femur, a fragmentation and chronic inflammation of the epiphysis, later a mushrooming of the head and a coxa vara. At all times the joint outline is distinct, and there is no destruction of bone or cartilage. X-ray also eliminates congenital dislocation and coxa vara. Iliopsoas and gluteal bursitis and cellulitis will be ruled out by rest. Osteomyelitis affects the shaft, and Pott's disease with psoas abscess gives

characteristic physical signs. Infectious metastatic arthritis is, rarely, persistently and progressively monarticular. Chorea, pseudomuscular hypertrophy, hysteria and growing pains must be borne in mind. Treatment depends upon two main principles, rest and fixation; rest in bed for at least two months after all acute symptoms have subsided and fixation for years even in early cases. The patient is strapped to a Bradford frame, and Buck's extension and weights are used to pull in the line of the deformity, until muscle spasm is overcome; later, by changing the axis of traction, the deformity can be overcome. Strict hygienic care is important and at times tuberculin in very small doses helps. Heliotherapy is also a great aid. Healing results by fibrosis, and, unless there is a secondary invader, bony ankylosis rarely if ever results. Progressively growing abscesses should be incised through healthy tissue, cleaned and closed without drainage. For sinuses, heliotherapy or bismuth paste and tuberculin, combined with autogenous vaccines, often help. These failing, the wide opening and cleaning of the tract permit healing from the bottom; heliotherapy aids here also. As a last resort, tenotomies should be done to relieve muscular spasm in cases with no secondary invaders. Ankylosis is an ideal result, but if the deformity is extreme a subtrochanteric osteotomy of the femur should be performed. Afterward the limb and back are placed in the desired position and held there by a plaster cast. When all pain, fever, muscular spasm and fluctuations have been absent for two months ambulatory treatment may be started. Weight bearing is avoided and the affected limb is absolutely fixed for at least six months. The cast or Thomas hip splint may now be replaced by a Davis hip splint which allows motion. If, after some time, all is well, weight bearing can gradually be resumed. Excision of the head and neck of the femur is almost never necessary in children. Arthroplasty with fat flaps should not be instituted until at least two years after discarding the brace. According to Sundt, 30 per cent of all cases admitted to the Fredriksvern Hospital in Norway between 1903 and 1918, with a diagnosis of tuberculosis of the hip, were found to be nontuberculous. Of these, 43 per cent were Perthes' disease and all recovered. If this is true the mortality of tuberculosis of the hip is alarming. Before Perthes' disease and syphilis were differentiated from tuberculosis of the hip, the general mortality was put at 40 per cent. Death results from pulmonary and meningeal tuberculosis and sepsis.—*Tuberculosis of the Hip, B. F. Buzby, N. York M. J. and Med. Rec., August 2, 1922, cxvi, 150.*

Cultural Diagnosis of Tuberculous Meningitis.—Modified Petroff medium which permits an early diagnosis of genitourinary tuberculosis also grows colonies from cerebrospinal fluid. As a rule, bacilli cannot be found in the latter but on this medium 1 cc. of fluid drawn as aseptically as possible gives a growth in five or six days.—*Application au diagnostic de la méningite tuberculose des mileux de culture électeifs pour le bacille de Koch, V. Despeignes, Compt. Rend. Soc. d. Biol., June 17, 1922, lxxxvii, 121.*

Tuberculous Gumma of Spinal Cord.—The case was one of a large solitary tubercle of the lumbar cord, with no other lesions except a caseous tuberculosis of the adrenal and some scattered tubercles of the lungs. There were no tuberculous antecedents. Evolution took place in eight months, with progressive paraplegia.—*Gomme tuberculeuse de la moelle épinière, Beriel and Morenas, Meeling, Société Médical les Hôpitaux de Lyon, April 26, 1922, reported in Presse méd., May 6, 1922, p. 394.*

Metastatic Tuberculides.—A patient, twenty years old, had many small follicular pustules on the face and scalp; the slow-healing lesions had been appearing for two years. He had also *lupus pernio* of the ear lobes, typical papulo-necrotic tuberculides on the fingers, and tuberculous cervical lymph nodes, conditions which had likewise been present about two years. The skin lesions were typical, but no pathological studies were made. There was a history of swollen cervical nodes seven years ago; these broke down and were removed two years later; healing was good. Two years before the cervical node swelling occurred, the patient had a severe sore throat and the tonsils and adenoids were removed. Physical and X-ray examinations showed an old, healed apical tuberculosis and diffuse peribronchial thickening, with no active lesions. The conclusion seems warranted that the three different forms of skin lesions may have been produced by tubercle bacilli coming from tuberculous cervical nodes, the form of the skin lesions being determined, probably, by conditions in the host and the virulence of bacilli. The local treatment was by X-ray and mercury quartz lamp. Tuberculin (B. F.) and iron arsenate were given semiweekly for nine months. All the skin lesions subsided, leaving only small scars.—*Acnitis, H. E. Alderson, Arch. Dermatol. & Syphilol., July, 1922, vi, 35.*

Causes of Pulmonary Abscess.—The records of the medical division of the Uni-

versity of Pennsylvania Hospital for the past twelve years record 18 cases of pulmonary abscess. The causes given are pneumonia 5 cases, extraction of teeth 2, convulsions 2, tonsillectomy 1, tonsillectomy and adenoidectomy with postoperative pneumonia 1, suppurating appendicitis 1, inguinal herniorrhaphy 1, and undetermined 5. Of the 13 cases attributed to a definite cause, 6 followed operations, 4 of these being on the mouth and throat.—*A Review of Eighteen Cases of Pulmonary Abscess, O. H. Prosser, The Milit. Surg., July, 1922, ii, 37.*

A Case of Mediastinal Hodgkin's Disease.—The case reported is that of a young girl of 19, whose course was followed for nearly two years, until death. At admission there existed a right pleural effusion, and mediastinal deviation toward the left was obscured radioscopically, persisting after removal of the effusion, together with a voluminous mass in the right hilar region. Six months later axillary lymph nodes appeared, and two tumors developed in the right sternoclavicular and chondrosternal regions. Over the right lung there was flatness, with complete opacity to the ray in spite of complete disappearance of the effusion. Autopsy showed involvement of the whole mediastinum and hemithorax by a process of neoplastic appearance. Microbic masses, formed of long rods taking gram's stain, were found in the nodes and also in the tissue removed at autopsy, but could not be isolated in pure culture; their significance is not possible to estimate, but the infectious nature of this condition seemed demonstrated by its clinical picture, the constant fever and the amyloid degeneration of liver and spleen.—*Un cas de maladie de Hodgkin à forme médiastinale, J. Genevrier and M. Lorrain, Meeting, Soc. Méd. d. Hôp., March 31, 1922, reported in Le Prog. Méd., April, 1922, no. 14, p. 168.*

X-Ray Treatment of Hodgkin's Disease.—The diagnosis of Hodgkin's disease of the mesenteric lymph nodes was made six and one-half years before death. The patient was under observation from the time diagnosis was made until she died. She received 95 treatments with X-rays and apparently the nodes decreased in size, especially the cervical nodes. She was usually nauseated and occasionally vomited after each treatment. These effects lasted several hours, but after they wore off she often felt better and it was believed that the rays had some beneficial effect. The course of the disease was slowly progressive, the acute stages became longer and the improvement in the periods of well-being diminished. Loss of weight was constant. The blood picture resembled that described by Bunting, and the temperature was of the recurrent type. The blood pressure was constantly low. The spleen at autopsy was only slightly enlarged. The patient developed a hydrothorax that required paracentesis which was probably due to involvement of the pleura. Death was due to perforation of the intestine. Because of the advanced stage of the disease when the diagnosis was made it is safe to say that the roentgenotherapy slowed the process.—*A Case of Hodgkin's Disease Treated with Roentgen Rays for Six Years, K. R. McAlpin and W. C. Von Glahn, Arch. Int. Med., September, 1922, xxx, 286.*

Bronchospirochetosis in China.—The disease may be simple or it may be complicated with pneumonia, pulmonary gangrene, empyema, tuberculosis of the lungs, moniliasis, paragonimiasis, or rhinitic spirochetosis. It is due to infection with a spirochete known as *Spironema bronchiale.* Bronchospirochetosis in the simple cases may be: 1. Acute, with chill, fever, constant cough, scanty expectoration and very seldom blood. 2. Subacute, with similar symptoms, plus hemoptyses and bronchitis. 3. Chronic, with protracted cough, mucopurulent sputum, often bloodstreaked, and frequently there is considerable hemoptysis. There may be râles or areas of consolidation. Intravenous arsenicals are specific and relatively rapid in their spirocheticidal properties. Three 0.6 gm. injections of neoarsphenamine at weekly intervals are usually sufficient. When the disease is complicated with tuberculosis, as it usually is, the administration of arsenicals eliminated the spirochetes from the sputum, but did not materially relieve the patient. The red blood count and the percentage of hemoglobin are low. The leucocyte count varies, and in simple infections there is a high eosinophilia. In each case the blood picture approaches normal with treatment.—*Bronchospirochetosis in China, E. C. Faust, Arch. Int. Med., September, 1922, xxx, 343.*

Exercise in Tuberculosis from a Neuromuscular Viewpoint.—The purpose of the paper is to record the more important mechanistic changes incident to physiological exercise and the maladjustments which occur in a person with active tuberculosis. The adjustments continually occurring in the respiratory and circulatory mechanism should be borne in mind; also, that a man's nervous organization is as important as his muscular development, and that his ability to perform muscular

work is not altogether gauged by the size of his musculature. The method employed in all cases of active disease is immediate and complete bed rest, except for toilet privileges. The duration of this varies with the case. Maintenance of the prone posture is frequently advisable. Even a change to the sitting or standing posture increases the pulse rate about 25 per cent and the oxygen consumption 20 per cent. Walking requires 100 per cent more expenditure of energy than lying down. At the onset of exercise there is an irradiation of stimuli to the vasomotor, respiratory and cardio-inhibitory centres, raising blood pressure and increasing respiration and pulse rate. Impulses also pass down through the lateral splanchnic columns from the fifth to twelfth thoracic segments, producing constriction of the splanchnic area; as a result, venous pressure is increased and also the diastolic volume of the heart. The muscles act as a subsidiary pump by squeezing the blood from the smaller capillaries into the veins. The appearance of lactic acid in the blood stream, from incomplete oxidation in the muscles, affects the hydrogen ion concentration, and by reacting with the plasma bicarbonate forms carbonic acid, which in turn acting upon the respiratory centre produces increased pulmonary ventilation; this in turn demands additional work by the heart. Great toxemia in tuberculosis may exist without elevation of temperature. In such a condition the hydrogen ion concentration of the blood is raised, and this favors tissue necrosis and delays healing which is in a measure dependent upon the alkaline salts. When the reaction of the blood swings to the acid side, reserve protein is transformed into available protein, according to the evidence adduced by Bradley and Taylor, and this undergoes autolysis. An increased blood supply and more complete removal of acid products may reverse the process. The hydrogen ion concentration also lessens arteriolar and capillary tone and accelerates the dissociation of oxyhemoglobin to the muscles. Maladjustments of the cardio-respiratory system produce interesting symptoms, practically all of which can be explained upon a mechanic or neurogenic basis. It is fair to assume that, in any chronic disease where there is muscular wasting, the nutritive condition of the heart must suffer. In many cases there is a physiological atrophy due to lessened venous inflow. As a result, there occurs ventricular thinning and loss of contractile power. Compensation is effected by acceleration of the pulse rate accompanied by palpitation. In many incipient cases there may be a purely neurogenic palpitation due to overflow of impulses down the cord to the stellate ganglion. Stimulation of the vagas and vasomotor centres may result in lessened tone with marked drop in arterial blood pressure. When this falls below 90 mm. mercury, the blood supply is inadequate for nutrition of the heart. The type of case most likely to exhibit marked loss of tone is that where fibrosis is extensive with associated widespread pleuritis. Where compensation cannot be effected, dilatation of the heart follows, the usual closing act in pulmonary tuberculosis. Rise in body temperature during exercise is conditioned upon its severity. Along with it there is heightened nervous excitability and increased metabolism. Physiological rise involves carbohydrate and fat oxidation while pathological elevation produces protein destruction, though not to such an extent as was formerly thought. There is a dissemination of stimuli from the cerebral cortex to the central sympathetic nervous system through nuclei in the midbrain and the splanchnic columns. Peripheral vasoconstriction and lessened heat dissipation are one result. Also, endocrine structures receiving a similar nerve supply become activated, and this may account for the increased metabolism. Toxemia is only one of the causes which provoke pyrexia. Many persons are distinctly sympathetico-tonic, and in such cases temperature is very labile. As for exercise, every case should be individualized. Walking should never be carried to the point of fatigue. There appear to be two types of fatigue; one arising entirely within the central nervous system and the other with a superadded muscular element. It has also been suggested that fatigue may be produced by exhaustion of the store of energy within the muscle and the clogging by metabolic products. The complex neutral processes involved in any voluntary movement or focussing of attention upon the exercise must also be considered to involve considerable expenditure of energy.—*The Status of Exercise in the Tuberculous Considered from a Neuro-Muscular Viewpoint, F. P. Miller, Am. J. Med. Sci., August, 1922, clxiv, 263.*

Pneumothorax Treatment of Acute Lung Abscess.—*Nomenclature:* Lung abscess may be diffuse or circumscribed; gangrenous or not. Its etiology is variable. The burrowing type of abscess extending from an interlobar empyema is here included. Ten cases are reported, the last being of five months' duration, and hence not strictly an acute form. Eight of the ten cases were women. None gave a history of previous lung disease, and in all repeated examinations of the sputum for tubercle

bacilli were negative. The *period of development* of the condition varied from five days to six weeks. In each case symptoms ultimately indicative of abscess developed about three weeks after the onset of pneumonia. The *etiology* was as follows: 4 cases followed the influenza bronchopneumonia syndrome, and several were probably preceded by interlobar empyema; 2 followed simple bronchopneumonia; the others followed pelvic operation and septic infarct, tonsillectomy under ether anesthesia and one a simple cold. The *physical signs* were somewhat variable, especially the breath sounds. Irregular or atypical areas of dulness and coarse moist râles were a common finding, more often in the lower lobe. Cough and expectoration were usually excessive and paroxysmal. The X-ray was of considerable assistance in determining the nature and anatomical relations of the process. *Spontaneous Cure:* A certain number of cases of abscess empty through a bronchus and recover perfectly. In the 3 such cases noted, the abscess was in an upper lobe. When the lesion is in a lower lobe, spontaneous cure is unlikely. Inversion posture is only occasionally helpful. *Time for Operation:* In this series the oldest abscess successfully treated, with one exception, was of 8 weeks' standing. In Tewksbury's series it was 6 weeks. The most advantageous time to operate would seem to be between the second and fourth weeks. It is doubtful whether compression should be undertaken when the abscess is near the periphery, as perforation into the external pleural cavity is to be expected. On the other hand, abscesses near the hilum, most inaccessible to surgery, are easily and promptly cured by mild compression. The question arises whether one is ever justified in carrying expectant treatment more than two weeks. Treatment must be kept up until the lesion has had time to heal, usually four weeks in acute cases, and much longer in chronic cases. *Prognosis:* Under the older methods the outlook is very discouraging. Forchheimer cites 133 cases of whom 10 per cent recovered and 64 per cent died. With major surgical treatment, according to Lord, incomplete cure is the rule, and there are many dangers and complications. Of the 20 cases reported by the author and by Tewksbury, 16 or 80 per cent promptly and completely recovered under artificial pneumothorax treatment.—*Acute Lung Abscess Treated by Therapeutic Pneumothorax, H. M. Rich, Am. J. Med. Sci., September, 1922, cxliv, 428.*

Antibodies After Artificial Pneumothorax.—In a study of six patients made by Bernard, Baron and Valtis it was found that after artificial pneumothorax there was a pronounced reduction of antibodies in four cases; in one case the antibody-content varied after operation; in another case there was no reduction. In this case the pneumothorax was incomplete and the lung collapse unsatisfactory. In all the patients the general state following operation was good, in the four with diminished and the one with variable antibody production the pneumothorax was satisfactory. A falling off of antibody formation seems therefore to coincide with an improvement in the general state and a satisfactory collapse of the lung.—*Sur le variations des anticorps tuberculeux dans le sérum des malades traités par le pneumothorax artificiel, Bernard, Baron and Valtis, Section d'Études Scientifiques de l'Oeuvre de la Tuberculose, Paris, Jan. 14, 1922, reported in Rev. d. l. Tuberc., 1922, iii, no. 2, 172.*

Effects of Artificial Pneumothorax on Heart and Blood Pressure.—Studies made upon rabbits concerning the immediate and ultimate results of pneumothorax show that arterial tension and cardiac rhythm undergo only a temporary disturbance, after which a return to normal takes place.—*Action sur l'appareil cardio-vasculaire du pneumothorax artificiel expérimental, J. Parisot and H. Herman, Comp. Rend. Soc. d. Biol., May 13, 1922, xxxvi, 1034.*

Influence of Artificial Pneumothorax on Growth and Nutrition.—Adult rabbits, in which one lung was made afunctional, began at once to lose weight (from 2400 grams to 2150 grams in twenty days). The weight curve descends, becomes stabilized, and then, in some cases, rises slightly. The muscles preserve their integrity but all the fat disappears, especially the abundant supply found around the kidneys. In young rabbits growth is retarded; those with a pneumothorax remain lighter and smaller, and at the age when growth normally ceases the weight becomes stationary. If, during growth, the pneumothorax is interrupted, the weight and growth are accelerated, but reëstablishment of the pneumothorax causes the growth to decrease again. The fur is also rougher and thinner in animals with pneumothorax.—*Action du pneumothorax artificiel expérimental sur la nutrition générale et la croissance, J. Parisot and H. Herman, Compt. Rend. Soc. d. Biol., June 6, 1922, lxxxvii, 177.*

Treatment of Tuberculosis by X-Ray Radiation over Spleen.—Manoukhine's method is based on the excitation of the spleen by a feeble dose of X-ray. In this

manner the production of a soluble ferment that the orginator calls *leucocytolysine*, is favored. It has the properties of dissolving the white blood corpuscles and liberating their specific antibodies, and of stimulating the bone marrow to produce new leucocytes. The long bones should not be radiated, for fear of causing the marrow to atrophy. This method has been tried on 25 cases, and the writer is enthusiastic as to its therapeutic efficacy. In patients with second stage involvement the tubercle bacilli generally disappear after 15 treatments. Out of 8 guinea pig inoculations, 5 showed negative results. Following each treatment there is a drop in temperature, but there is usually a reaction with weakness, loss of weight and increase in expectoration and adventitious signs, between the fifth and ninth treatments. There seems to be a relation between the extent of the lesion and the intensity of the reaction, which may last from two to four weeks. Practically all patients gain weight. Intestinal and kidney involvement lessen to a very great extent the efficacy of the treatment and may, in some cases, be a contraindication. *Conclusions:* 1. By the Manoukhine method the bacilli may be eliminated from the sputum. 2. Provided that the patient can digest food, a considerable number of pulmonary, visceral or bone cases can be greatly benefited and perhaps even definitely cured. 3. The method should be tried in desperate cases; sometimes almost hopeless cases can be brought back to health. No details as to X-ray dosage and time intervals are given.—*Traitement de la tuberculose par la méthode du docteur Manoukhine, Donat, Le Prog. Méd., April 1, 1922, no. 13, p. 147.*

Subcutaneous Oxygen Injections in Treatment of Pulmonary Tuberculosis.—Studies were made on the blood and antibodies of 32 patients, treated by subcutaneous oxygen injections, following the method of Bayeux. There was noted amelioration of the general condition, alteration in number of red cells and leucocytes, and especially a noteworthy lowering of the antibody-content of the serum.—*Action des injections sous-cutanéus d'oxygène dans le traitement de la tuberculose pulmonaire, A. Delille, Hillemand and Lestoquoy, Meeting Soc. Méd des Hôp., March 3, 1922, reported in Le Prog. Méd., March 11, 1922, no. 10, p. 118.*

Cerium Salts in Treatment of Tuberculosis.—Workers who have employed the cerium salts in the treatment of tuberculosis, have, according to Dr. Justin Roux, forgotten the second factor in every chemical reaction, namely, the medium in which the reaction takes place. The tuberculous medium is acid; phenomena of oxidation require a neutral or preferably an alkaline medium. The cerium salts, as is seen in their chemical behavior, can determine only oxidation. It would be an indispensable preliminary to its therapeutic action to render the blood of a tuberculous subject alkaline before injecting an oxidizing salt, an oxidase or a hydrating agent. The concentration of hydrogen ions ought to be determined before employing a direct antituberculous therapy; a study of the morbid medium would doubtless explain many therapeutic failures.—*À propos de l'emploi des sels de terres cériques dans le traitement de la tuberculose, J. Roux, Section d'Études Scientifiques de l'Oeuvre de la tuberculose, reported in Rev. d. l. Tuberc., 1922, iii, no. 1, 76.*

Artificial Pneumoperitoneum.—*Historical:* This procedure was applied in Germany for purposes of radiological diagnosis by Betz in 1914, Goetz in 1917 and Rautenberg in 1918. It rapidly became popular by reason of its great services in surgical conditions of the abdominal viscera, and within the last three years has been practised on a large scale in France and abroad. Notable publications have appeared by Alessandrini in Italy in 1919, Stern and Stewart in America, and in France by Libadeau-Dumas, Mallet, Baud, de Laulerie and Coliez. *Indications:* Pneumoperitoneum is of special value in the diagnosis of abdominal tumors; it is possible to determine the anatomical relations of the tumor and viscera and the existence and extent of adhesions; it is of assistance in the diagnosis of such gynecological conditions as cysts, fibromata and displacements, and even in the diagnosis of urinary and biliary calculi. *Technique:* The subject is prepared beforehand by emptying bladder and intestines. Preliminary hypodermic of morphine is not generally recommended, but the zone of puncture is anesthetized locally. The material and instruments needed are: (1) a short pointed needle, at least 6 cm. long and about 0.8 mm. internal diameter, a lumbar puncture needle, or a trocar, or a Potain or Dieulafoy aspirating needle, or best a Kuss artificial pneumothorax needle; (2) a container with oxygen or carbon dioxide or a mixture of the two; and (3) an artificial pneumothorax apparatus. The gas of choice is carbon dioxide, which is very rapidly absorbed (in about one-half hour); therefore, when this gas is used the radioscopic examination should be made immediately after injection, and in civil practice the patient may shortly afterward return home. Oxy-

gen is more slowly absorbed (in from two to twelve hours) and in such cases an interval may elapse before the radioscopic examination. Air is much more slowly absorbed and its use is not recommended. The amount of gas to be injected varies with the case and the abdominal condition; usually, 2 litres suffices, though up to 3 or 4 may be injected if the trocar be left so that the excess may escape. The site of choice for the puncture is in the neighborhood of the umbilicus and to the left of the midline; that is, about the external border of the left rectus muscle and not more than two finger-breadths above or below the umbilicus. The skin and abdominal wall are anesthetized with 0.5 per cent novocain, and the trocar or needle is introduced obliquely toward the midline, penetrating the layers of the rectus aponeurosis in order. After penetrating to the depth of 1 cm. a blunt tip should be used and a single stroke enters the peritoneum, accompanied by a perceptible snap as though a taut fabric were transfixed. There is practically no danger of intestinal perforation, because the intestine recedes and gives way before the trocar. On entering the peritoneum, the subject is told to breathe deeply, giving rise to characteristic manometric oscillations. The gas is then allowed to flow in slowly, as in artificial pneumothorax; the abdomen distends and the viscera become separated from the parietes. After about 600 cc. the patient may experience slight pain and difficult breathing; if he becomes dyspneic the rate of injection should be slower. The total time consumed should not be less than ten or fifteen minutes. After a suitable interval radioscopic examination is performed in ventral, dorsal and lateral positions; the first position, abdominal decubitus, gives the clearest picture. *Incidents and Accidents:* The degree of pain and distension are variable but usually slight, more a feeling simply of tension; occasionally pains radiate to the hypochondrium and shoulder, the latter being explained by tension on the diaphragm. Subcutaneous and subperitoneal emphysema is rare and not serious. Intestinal perforation can only occur (1) when an intestinal coil is interposed between a solid tumor and the site of puncture, and (2) when there are adhesions at this site, in which case one simply insufflates the intestine. Syncope occasionally occurs, nearly always when the patient rises or sits up, increasing the intraperitoneal pressure, and more often when oxygen is used instead of carbon dioxide; in such cases the examination should be deferred. Preliminary use of morphine may prevent this occurrence. *Contraindications:* (1) pregnancy near term; (2) the existence of extensive abdominal adhesions, such as result from peritonitis, (3) acute peritoneal infections, (4) the pressure of an encysted suppurating focus, (5) excessive intestinal distension, (6) hypotonic weak abdominal muscles, especially in the emaciated or cachectic, (7) cardiac or respiratory disturbances and (8) the existence of a tumor immediately beneath the only feasible sites of puncture.—*Le pneumo-péritoine artificiel (Indications, contre-indications, technique, accidents), G. Paturet, Le Prog. Méd. April 8, no. 14, p. 163.*

Prophylaxis of Tuberculosis in the French Merchant Marine.—Dr. Clerc spoke of the prevention of tuberculosis on merchant ships where its incidence among the crews is greater than among workers of corresponding rank in the great cities, being particularly frequent among the workers below decks. He discussed the backwardness of French conditions in relation to prevention as compared with the conditions that have been created by foreign countries, particularly by the United States, where not only have all tuberculous employees been excluded from merchant ships, but all foreign ships have been made subject to the same regulations in force for imigrants; that is, all ships which bring passengers into the United States are forbidden to employ persons suffering from tuberculosis in any form. The condition of work and the living accommodations for a ship's personnel favor the spread of tuberculosis, when subjects liable to disseminate tubercle bacilli are employed. On the other hand, the circumscribed area of a ship and the possibility of radical, periodic disinfection create, from the point of view of prevention, an immense advantage over terrestrial conditions. Consequently, to prevent tuberculosis aboard ships, however bad may be the conditions of work and of life that they maintain, it is only necessary to prevent tuberculous workers from being hired, and to limit the transportation of tuberculous passengers to ships that possess facilities for their isolation and care. After some discussion, the Congress adopted a resolution to combat tuberculosis infection aboard merchant ships. They advocated improvements in ventilation and in space allotment, and strict regulation concerning the employment of sailors on all commercial ships, without regard to the length of voyage, to the end that no sailor having an open tuberculosis be employed.—*Prophylaxie de la tuberculose à bord des navires de commerce. Necéssité de l'éviction des marins tuberculeux par une visite médicale avant l'embarquement, Clerc, Cong. Ann. d'Hyg., Paris, Nov. 3–8, 1921, reported in Rev. d. M. Tuberc., 1922, iii, no. 1, 47.*

Résumé of English and American Tuberculosis Literature, 1919 to July, 1920—Not suitable for abstracting.—*Übersichtsbericht über die Englische und Amerikanische Tuberkulose-Literatur* 1919 *bis Juli 1920, H. Müller, Centralbl. f. d. ges. Tuberk. Forsch., March, 1921, xv, 2.*

Tuberculosis Section of British Medical Association.—At the 1922 meeting in Glasgow a tuberculosis section was held for the first time in the history of the Association. A résumé of some of the discussions is presented.—*An Impression of the Work of the Section of Tuberculosis at the Glasgow Meeting of the British Medical Association, A. S. M. Macgregor, Brit. J. Tuberc., October, 1922, xvi, 185.*

Tuberculosis Suspects.—An important group among patients suspected of having pulmonary tuberculosis is of those who attend our out-patient departments and dispensaries and in whom only a provisional diagnosis of tuberculosis is made. These patients are always asked to return for further examination but, in far too many instances, they do not return. In an effort to determine what became of these cases, a careful study was made of all patients diagnosed or provisionally diagnosed as having pulmonary tuberculosis at the six large out-patient departments and dispensaries of the City of Boston, between April, 1920, and April, 1921. Out of 963 patients included in this study, there were 415 in whom a provisional diagnosis of pulmonary tuberculosis had been made. None of these 415 had returned to the out-patient department for a definite and final diagnosis, but 140 of them afterward visited some other institution or a private physician, and 92, or 62 per cent, of these were definitely diagnosed as having pulmonary tuberculosis, and so reported. There remains, however, a large number, 338, who, as far as could be determined, have never been reexamined or given a definite diagnosis one way or the other. This is a group of patients which ought not to exist under such conditions and which, if it must exist, should be reduced to the lowest possible figure. To help solve this problem the author points out the advantages of the "one-man" or "two-man" special clinics as against general out-patient departments and dispensaries, and also stresses the importance of the social service department for home investigation, and the value of recording all provisional diagnoses at the central office just as positive cases now are.—*The Problem of the Tuberculous Suspect, J. B. Hawes, 2nd, Boston M. & S. J., December 21, 1922, clxxxvii, 928.*

Phipps Institute and the Negro.—For 1921, the census in Philadelphia showed a population of 1,823,779 among the Whites and of 134,229 among the Negroes. The death rate of the former was 12.46 per 100,000, and of the latter, 15.55 per 100,000. The rate for tuberculosis alone shows that the Negro is about four times as susceptible to the disease as the White. In the early years of the Institute, the Negroes who came to the clinics, more or less by accident, could seldom be induced to persist in their attendance, and no considerable progress could be made with them as individuals. This situation was changed in 1914 by adopting the principle of operating through the medium of selected negro workers. Since its beginning this clinic has treated 2116 Negro cases, of which 510 were cared for during the past nine months. In 1914 the Whittier Centre was induced to employ a colored nurse to work as a member of the staff of the Institute. Her work at once had a marked effect. The Whittier Centre has continued to support a worker at the Institute Clinic, and at the present time it pays for the services of three graduate negro nurses. Since 1915, the Philadelphia Health Council and Tuberculosis Committee has augmented the staff of the Phipps Institute Negro Clinics by paying the salaries of negro doctors and nurses. At present it is providing support for the work of two doctors and three nurses. In order to increase the supply of negro nurses trained in tuberculosis work, six nurses from the Mercy Hospital have been given intensive training on the subject under the direction of the head worker at the Institute. Having a capable negro doctor in charge has made an appreciable difference in increasing the numbers of patients attending the clinics.—*Phipps Institute and the Negro, Bulletin no. 6, Henry Phipps Institute, Philadelphia, December, 1922.*

Avicenna's Ideas of Tuberculosis.—In examining the writings of the great Arabian physician, Dinguizli of Tunis has found an extremely interesting account of tuberculosis and its treatment. Avicenna regarded tuberculosis as a general consumptive disease capable of producing *ulcerous eruptions* in different parts of the human body, which, if localized in the respiratory organs, constituted a pulmonary phthisis. He studied its manifestations in the mediastinum, the pleura and the lungs. In disease of the lung three stages occurred: the preinflammatory condition, the rodent ulcer and the cavity. He distinguished carefully between other types of fever and the fever of tuberculosis which he called *hectic fever*. Among other symptoms, he mentions the

cough, more frequent by night than by day, the profuse night sweats, the rapid emaciation, the deformity of the ends of the fingers and toes, and the swelling of the legs shortly before death. Concerning treatment, he extolled direct action upon the ulcers by injections of a liquid rich in honey or by an infusion of red roses; at the same time, he recommended absorption through the stomach of great quantities of red roses steeped in honey or sugar, and a milk cure, consisting of ass's or goat's milk, uncontaminated, and as pure as possible. He also insisted upon the influence of open air treatment and upon psychic care.—*Un point d'histoire medicale: les conceptions d'Avicenne sur la tuberculose et son traitement, Dinguizli, Academie de Médicine, Paris, July 4, 1922, Reported in Prog. Méd., July 15, 1922, no. 28, 333.*

Incidence of Tuberculous Infection during School Age.—In a school in Holn-Lindenthal all the children (550 of a total of 650 where permission was obtainable) were given Pirquet tests, using full strength O.T. Only reactions of 4 to 5 mm., with visible and palpable nodules, were considered positive. The results obtained were of 129, 6 to 7 years old, 49 per cent were positive; of 207, 8 to 10 years, 51 per cent; of 146, 11 to 12 years, 64 per cent; and of 68, 13 to 14 years, 76 per cent, an average of 57 per cent for all. Manifest tuberculosis was found in only 2. The criticism of many previous reports is that the latter are obtained from clinics, orphanages or private patient sources, all being suspected material. Lack of age correlation studies may also result in low figures. In how far the war may have influenced the above figures cannot be stated, because prewar figures are lacking. The above figures were obtained in children of the better middle class and are lower than those of Hamburger and Monti in Vienna.—*Zur Häufigkeit der tuberkulösen Infektion im Schulalter, Vonessen, Beitr. z. klin. d. Tuberk., January 14, 1922, xlix, 357.*

Physical Defects in Drafted Soldiers.—The total number of drafted men in the United States prior to December 15, 1917, was 3,764,000. Of this group 550,000 were rejected by their local boards as physically unfit for all military service. Of those considered physically fit, amounting to approximately 3,200,000, more than 2,700,000 entrained for the military camps. The physical examination of these Class 1 men by the local and camp examining boards showed that 47 per cent had a physical defect of sufficient importance to note on the reports of the examinations. The number of defective men varies by states from 64 per cent in Rhode Island to 35 per cent in Kansas. Rhode Island is the most urban of all states and its percentage of native born population is only 29.4 per cent, which accounts largely for the high proportion of defective and nonresistant stock; Kansas, however, has 65 per cent native born and, being largely agricultural, has a more robust type of people. The French Canadian group had the highest number of defective men (55 per cent), while that of the native whites of Scotch origin had the smallest (40 per cent). The cities furnished a larger percentage of defective men (51 per cent) than the rural districts (44 per cent). Of all Class 1 men, 21 per cent were found physically unfit for all military service. The more important causes of rejection were: organic diseases of the heart, 11.5 per cent of the total causes of rejections; tuberculosis, 9.3 per cent; errors of refraction, 8.4 per cent; underweight, 7.6 per cent; mental deficiency, 4.5 per cent; hernia, 4.3 per cent; flatfoot, 3.6 per cent; defective and deficient teeth, 3.2 per cent; defective speech and hearing, 2.6 per cent. Of the large class of diseases, the defects of the bones and organs of locomotion ranked first, with 17.2 per cent of the total causes of rejection; diseases of the heart and blood vessels, second, 15 per cent; diseases of the eye, third, 12.6 per cent; and tuberculosis, fourth, 9.3 per cent. Considering the total number of defects rather than of defective men, there were 56 defects noted in each hundred men; nine men out of each hundred had two defects. The average height of 1,000,000 men was 67.49 inches (171.4 cm.). The shortest men came from Rhode Island and the tallest from Texas. The average weight for the United States was 141.54 pounds (64 kg). The heaviest men were from South Dakota and the lightest from Rhode Island. Among the men who were sent to the military camps and were rejected there on account of pulmonary tuberculosis, 82.6 per cent were under the required weight for their stature. If greater attention could have been directed by the local boards to the relative weight, probably a larger percentage of such cases could have been detected. Of the individual defects which were recorded most frequently in the men examined, the principal ones occurred in this order: flatfoot, 11.7 per cent; venereal diseases, 5.7 per cent; hernia, 4 per cent; refractive errors of the eye, 3.3 per cent; underweight, 3.1 per cent; tuberculosis, 2.5 per cent; hypertrophied tonsils, 2.3 per cent; defective teeth, 1.4 per cent; mental

deficiencies, 1.2 per cent.—*Physical Defects Discovered in Selective Draft Men During the World War, M. W. Ireland, J. Am. M. Ass., November 4, 1922, lxxix, 1579.*

Distribution of Physically Unfit.—This article is based on the published results of the examinations of drafted men in the recent war. It is an attempt to criticize the statistics and suggest some conclusions which, though not proved, seem probable. Sources of information are the Second and Final Reports of the Provost-Marshal-General and the War Department's Publication, *Defects Found in Drafted Men*, by Love and Davenport. The Provost-Marshal-General's figures for physical rejections in his Final Report are based on a total of over 17 million men classified, of whom not more than 6,554,000 were examined physically, and these local examinations varied in quality. The Second Report is based on only 3,218,000 men. Love and Davenport, realizing the local variations in standards, based all their ratios on hypothetical totals obtained by assuming that the men who had been passed by the local boards and were not reëxamined at the cantonment would have been rejected in the same proportion that has obtained in actual examinations of other men from their states. The number of actual examinations considered by them is a little less than 2 million at the camps plus about one-half million rejections and something over a million acceptances by local boards, a total of 3,764,000 cases. There must also be considered about 1,850,000 volunteers, all physically fit, who are grouped by states; their omission seriously altered the relative standing of the states. Not to consider them would be as if a milk inspector should attempt to compare samples some of which had been skimmed and some not. They are equal in number to over 28 per cent of the total examined by the draft officials. The proportion of volunteers varied from about 20 per cent in South Carolina to over 55 per cent in the District of Columbia. Only one-third of the local board's examinations need correction for low standards and it is probable that the examinations were abnormally severe in New England and New York. In general, the states that furnished the most volunteers also had careful examinations. It is also estimated that there were 625,000 men between the ages of 21 and 31 who had enlisted in the army, navy, national guard or marine corps before the draft registration date, and therefore were not included in the draft statistics. The percentage of rejections for the United States as a whole would be 13.1 per cent of the men 21 to 31 years of age if this estimation is correct. In this investigation it seemed best to attempt an analysis of the men aged 18 to 45 on the basis of the figures in the Provost-Marshal-General's report; the number of these being much larger, the effect of local variations in physician's standards will presumably be minimized. To the number of men registered in each state is added the number not registered on account of being in the federal service. The resulting table, arranged by states, shows some interesting differences. Of the 15 states that have the highest proportion of negroes in their population, 9 show a very high proportion of rejections, in spite of the fact that the medical examiners in some were supposed to have been rather easily satisfied. With regard to foreign elements and physical disability, it is difficult to prove a correlation. With reference to the relative standing of rural and urban states, the figures do not prove any superiority of the country over the city. There appears to be a correlation between the growth of a state by internal migration and its physical rating; namely, of the 12 physically superior states 9 gained more residents than they lost through interstate migration, and of the 12 inferior states 7 lost more than they gained. The results of this analysis are necessarily tentative, on the whole: 1. They seem to show a superiority of the native white stock over the immigrant strains. 2. They almost certainly show a superiority of whites over negroes. 3. They are consistent with Love and Davenport's conclusions as to the freedom from defect of the northern native white agricultural districts and the Scandinavian groups and the relative excess of defects among the negroes and the mountain whites of the Appalachians. 4. They seem to indicate that Americans living outside the state of their birth are, as the result of a selective process, physically superior to the stay-at-homes; and that, in consequence, the rapidly growing states are physically superior to those with more nearly stationary populations. There are, however, no indications that the inferiority of the latter has developed into racial degeneracy except possibly in some parts of Maine, Vermont, Georgia, Kentucky and Tennessee.—*Distribution of Men Physically Unfit for Military Service, R. S. Tucker, J. Amer. Statist. Assoc., September, 1922, xviii, 377.*

Tuberculous Infection and Tuberculosis Mortality.—The percentage of positive cutaneous tuberculin reactions increases steadily from about 8 per cent in the first year of life to about 90 per cent

in the fourteenth year. Naegeli's autopsy records were analogous to the above findings, so far as the continuous increase of positive pathological pulmonary changes indicated a healed or active tuberculous lesion. In adults the positive Pirquet reactions are 98.1 per cent from a series of 477 cases of apparently healthy individuals. With Hamburger's puncture reaction only one case of a similar series of 215 reacted negatively. Beyond the age of twenty everyone, for all practical purposes, is infected. Statistics of Prussia's total population for a period of five years show that the tuberculosis mortality decreases steadily from 2.54 per thousand in the first year of life to 0.36 in the tenth year, after which it continually increases to 6.07 in the eightieth year, after which it again declines to 1.56 above the age of eighty. From these figures it may be concluded that it is not infection with tubercle bacilli but the resistance of the patient, as expressed in age, that is the determining factor in longevity. The experience of the leading life insurance companies of Germany has been that the chance of death of a person in the first five years following the issue of an insurance policy does not depend in any way on the previous tuberculous infection, but on the weight and waist measurements of the person.—*Ansteckung, Erkrankung und Tod durch den Tuberkelbacillus im Sichte der Statistik, L. Ascher, Klin. Wchnschr., April 1, 1922, no. 14, 693.*

Results of 1920 Census.—The population of the United States, not including outlying possessions, was found to be a little over 105,000,000, an increase of 14.9 per cent since the preceding census, the lowest rate of decennial increase yet recorded in our history. It may be noted that the United States has passed throughout a period of 35 per cent increase lasting seventy years followed by a period of 26 per cent increase lasting thirty years. The decade just completed may inaugurate a 15 per cent period. There is a tendency to restrict immigration, apparently supported by public sentiment, and also a tendency toward smaller families and a lower birth rate on the part of the native population. Between 1900 and 1910 over 8,000 000 immigrants arrived in the United States, whereas in the last decade the number was about 5,000,000, hardly more than enough to make good the losses from emigration and from deaths among immigrants. Consequently, the percentage of increase for the foreign-born whites fell from 30.7 to 3.8. That difference largely accounts for the retardation of our population growth. The urban percentage in our population has now crossed the halfway mark, being 51.4 in 1920 as compared with 45.8 in 1910. Previous figures were 40 in 1900, 35.4 in 1890, and 28.6 in 1880. The contrast between the urban and rural rate of growth was very pronounced in the last decade, the urban population increasing 26.4 per cent, and the rural 3.2 per cent. The rural population includes numerous small incorporated villages, boroughs, and towns of less than 2500 inhabitants. An increase in the urban percentage, although sometimes deplored or featured sensationally as alarming, is probably inevitable in a settled and growing country, although not necessarily so to the degree which takes place. Where the good agricultural land has been practically all taken up, if the population is still to increase there is no alternative except more intensive methods of agriculture or the establishment of rural industries which could thrive without the creation of an urban centre. Areas of decreasing population, due to migration toward the larger centres, are seen in every state excepting Connecticut and Arizona. These areas take in 78.2 per cent of the total areas of Missouri, 77.9 per cent of Delaware, 68.4 per cent of Indiana, 61.2 per cent of New York state, and 60 per cent of Vermont. Moreover, in nearly every state the area of decreasing population is larger than ten years ago. There are a few exceptions, notably Iowa, also Wisconsin, Minnesota, and Utah. Thus, almost every state may be divided into two contrasted groups of counties, the one populous and increasing, the other sparsely populated and decreasing. The census also indicates that the problem of assimilation has become slightly less formidable, the percentage of foreign-born whites having decreased from 14.5 in 1910 to 13.0 in 1920, and the negro percentage from 10.7 to 9.9. However, in the Middle Atlantic States 35.4 per cent of the male population 21 years of age and over is foreign-born; in the New England States 38.2 per cent; and in New York City 63.4 per cent. The census also shows a decrease in the proportion of children, probably reflecting a declining birth rate and possibly also a diminishing death rate in the older age periods. *Conclusions:* 1. There has been a retardation of population growth in the United States in the last decade together with an increase in the percentage urban and a marked extension of the area of decreasing population. 2. There has been a decrease in the foreign-born percentage caused by the check to foreign immigration, and in the negro percentage, indicating a declining birth rate for that race. 3. There has been a

decrease in the proportion of children and of adults under thirty-five, and a corresponding increase in the proportion above thirty-five.—*Some Results for the 1920 Population Census, J. A. Hill, J. Amer. Statist. Assoc., September, 1922, xviii, 350.*

Tuberculosis Mortality in the United States, 1921.—The Department of Commerce, through the Bureau of the Census, announces that about 88,000 deaths were due to tuberculosis in the death registration area of the United States in 1921, and if the rest of the United States had as many deaths from this cause in proportion to the population, the total number of deaths from tuberculosis in the entire United States for 1921 was about 107,000, or 15,000 less than the 122,000 estimated for 1920. The trend of the tuberculosis death rate is downward. In the 34 States of the registration area, all except one, Utah, show their lowest rates for the year 1921, as presented in the table on page 14. The tuberculosis death rate in the registration area in 1921 was 99.4 per 100,000 population against 114.2 per 100,000 population for the year 1920. To permit better interstate comparisons for the year 1921, adjusted rates based on the standard million population have been calculated. The highest "adjusted" tuberculosis rate for 1921 is 173.8 per 100,000 population for the State of Colorado, and the lowest is 36.7 per 100,000 population for the adjoining State of Nebraska. The high rate for Colorado is evidence not of unhealthfulness of the climate, but of the attractiveness of the Colorado climate to those afflicted with tuberculosis. For the States with considerable colored populations, adjusted rates have been calculated separately for the white and colored populations. In this group of States the highest adjusted tuberculosis rate for the white population is 115.7 per 100,000 for Kentucky and the highest adjusted rate for the colored population is 325.1 per 100,000 population for the same State. The lowest adjusted tuberculosis rate for the white population is 55.7 for Mississippi and the lowest for the colored population is 159.7 per 100,000 population for Florida.—*Mortality from Tuberculosis in the United States, 1921, Public Health Reports, U. S. P. H. S., December 15, 1922, xxxvii, 3094.*

Resident Tuberculosis Deaths in New York State.—Recently the New York State Department of Health had occasion to allocate nonresident deaths from tuberculosis for a period of twelve years. This was done by charging the tuberculosis deaths which occurred in New York State (exclusive of New York City) to the district in which the decedent resided when the disease began. Thus, rates were obtained for the leading cities, based on the mortality of actual residents. The State contains some of the most famous tuberculosis resorts in America, which receive many hundreds of patients, not only from New York State itself, but from all over the country. Although it was impossible to obtain the number of State residents who died outside of the State, it can safely be assumed that this number would be negligible. It was discovered that in upstate New York an average of 441 persons die annually whose residence is New York City and an average of 184 whose residence is entirely outside the State. As a result the annual resident tuberculosis rate for upstate is from 10 to 15 points lower than the recorded rate. By charging the deaths of New York City residents to the City and excluding the tuberculosis deaths of nonresidents from that area, its annual resident rate becomes 3 to 5 points higher. The following table shows the recorded and corrected tuberculosis mortality for New York City and for upstate:

YEAR	NEW YORK CITY			
	Deaths		Rates	
	Recorded	Corrected	Recorded	Corrected
1916.....	9,642	9,847	181.5	185.4
1917.....	10,142	10,378	187.8	192.2
1918.....	10,098	10,344	184.0	188.5
1919.....	8,498	8,644	152.4	155.0
1920.....	7,135	7,375	126.0	130.2
1921.....	5,922	6,088	102.9	105.8

	NEW YORK STATE (EXCLUSIVE OF NEW YORK CITY)			
	Deaths		Rates	
	Recorded	Corrected	Recorded	Corrected
1916.....	6,178	5,649	131.3	120.1
1917.....	6,490	5,896	137.5	124.9
1918.....	6,875	6,141	145.1	129.6
1919.....	5,980	5,242	125.7	110.2
1920.....	5,408	4,778	113.3	100.1
1921.....	4,853	4,328	101.3	90.4

It was found in making the adjustment for the ten largest cities in the State that in all but two the "corrected" rate was in general higher than the recorded; also, that the annual number of nonresident deaths

Deaths and death rates from tuberculosis (all forms) in the registration area (exclusive of Hawaii) and in the registration States

AREA	NUMBER OF DEATHS			Adjusted rate,[1]	CRUDE RATE[2] PER 100,000 POPULATION				
	1921	1920	1919	1921	1921	1920	1919	1918	1917
Registration area	88,135	99,916	106,985	(3)	99.4	114.2	125.6	150.0	147.1
Registration States[4] (1917)	73,533	83,349	90,008	(3)	99.9	114.8	125.7	149.7	144.7
California	5,422	5,555	5,910	137.2	151.1	159.6	175.3	186.7	177.2
Colorado	1,775	2,134	2,005	173.8	184.6	225.4	215.1	242.9	194.8
Connecticut	1,364	1,666	1,729	92.7	95.9	119.4	126.5	153.9	160.4
Delaware	318	327	363	136.3	140.6	146.0	163.6	(5)	(5)
Florida (total)	959	1,021	1,003	96.2	95.7	104.1	104.8	(5)	(5)
White	417	435	471	61.9	62.4	67.1	74.9	.....	.....
Colored	542	586	532	159.7	162.5	176.8	161.6	.....	.....
Illinois	5,617	6,568	7,395	81.1	84.9	100.6	114.9	135.7	(5)
Indiana	2,752	3,201	3,331	89.7	92.8	108.8	114.1	140.2	139.5
Kansas	772	855	894	42.3	43.3	48.2	50.6	59.8	59.8
Kentucky (total)	3,197	3,705	3,982	136.6	131.2	152.9	165.3	199.0	198.8
White	2,424	2,851	3,109	115.7	110.0	130.3	143.1	169.3	166.1
Colored	773	854	873	326.1	333.1	363.8	367.8	466.0	486.1
Louisiana (total)	2,228	2,550	2,577	128.4	122.4	141.2	143.9	185.8	(5)
White	778	894	879	73.7	69.4	80.9	80.8	109.0	.....
Colored	1,450	1,656	1,698	213.7	207.2	236.2	241.7	302.9	.....
Maine	634	799	793	79.0	82.1	103.8	103.4	121.4	117.1
Maryland (total)	1,997	2,139	2,390	132.4	135.5	146.8	165.8	207.6	195.9
White	1,252	1,337	1,549	97.9	102.1	110.4	129.4	163.1	150.8
Colored	745	802	841	299.6	301.8	326.6	344.2	423.4	413.6
Massachusetts	3,870	4,412	4,901	94.5	98.5	113.8	128.0	159.0	145.9
Michigan	2,755	3,101	3,106	70.9	72.5	83.6	85.7	101.5	96.6
Minnesota	1,875	2,151	2,246	75.3	77.0	89.6	94.7	104.6	102.1
Mississippi (total)	1,989	2,287	2,436	120.4	111.1	127.8	136.0	(5)	(5)
White	423	410	488	55.7	49.5	47.8	57.3	(5)	(5)
Colored	1,566	1,877	1,948	177.8	167.2	201.2	207.1	(5)	(5)
Missouri	3,182	3,644	3,984	88.9	93.0	106.9	117.2	144.4	149.2
Montana	356	419	480	56.5	61.8	75.1	88.9	96.8	108.8
Nebraska	487	561	(5)	36.7	37.1	43.0	(5)	(5)	(5)
New Hampshire	351	430	453	76.8	78.9	97.0	102.5	126.1	113.9
New Jersey	3,043	3,635	3,978	89.9	93.6	114.0	127.4	157.4	154.3
New York (total)	10,836	12,634	14,538	96.3	102.4	120.9	140.9	167.9	166.3
White	10,117	11,848	13,582	91.9	97.7	115.8	134.4	161.8	161.1
Colored	719	786	956	306.9	321.7	362.8	455.7	475.0	429.4
North Carolina (total)	2,739	3,004	3,110	117.7	104.8	116.5	122.4	138.7	137.8
White	1,266	1,491	1,521	77.8	69.3	82.8	86.0	94.7	94.2
Colored	1,473	1,513	1,589	211.1	187.4	194.2	205.9	238.8	236.4
Ohio	5,270	5,975	6,539	85.0	89.1	102.8	114.6	136.2	134.8
Oregon	608	703	704	72.9	76.0	89.1	90.6	88.1	(5)
Pennsylvania (total)	8,197	9,213	10,327	90.7	92.3	105.0	119.1	151.6	138.6
White	7,194	8,267	9,334	82.5	83.8	97.5	111.4	141.8	129.1
Colored	1,003	946	993	314.9	333.0	324.1	351.3	447.0	438.0
Rhode Island	663	798	895	104.2	108.0	131.3	148.8	181.5	172.9
South Carolina (total)	1,901	2,031	2,271	124.9	111.2	120.0	135.6	144.5	144.8
White	440	540	552	58.1	52.4	65.5	68.0	67.9	70.0
Colored	1,461	1,491	1,719	192.1	168.0	172.0	199.0	215.4	213.0
Tennessee (total)	3,304	3,860	3,938	148.4	139.9	164.6	169.0	206.8	199.1
White	2,039	2,451	2,376	114.2	106.6	129.3	126.6	151.5	155.6
Colored	1,265	1,409	1,562	284.8	282.0	312.6	344.9	432.5	374.5
Utah	184	177	200	41.3	39.9	39.1	44.8	47.8	44.6
Vermont	245	288	321	65.9	69.5	81.8	91.0	104.5	93.4
Virginia (total)	3,131	3,319	3,445	140.7	133.4	142.9	150.1	183.6	169.8
White	1,423	1,545	1,567	90.6	86.1	94.8	97.5	126.1	109.2
Colored	1,708	1,774	1,878	258.4	246.0	256.2	272.0	315.9	307.6
Washington	1,150	1,346	1,385	79.4	82.7	98.4	103.0	103.6	100.2
Wisconsin	2,014	2,267	2,202	74.0	75.2	85.6	84.1	94.4	97.3

[1] The adjusted rate makes allowance for the differences in the age and sex composition of the populations in different States by showing what the death rate would be if all States had the same proportion of males and females and the same proportion of the total population in each age group.

[2] The crude rate is based on total population and includes all deaths occurring within the given State.

[3] Rate not calculated.

[4] Including District of Columbia.

[5] Not admitted to registration area until a later date.

formed an almost constant percentage of the recorded deaths, thereby not affecting the general trend of the mortality. The "correction" is of importance chiefly when it is desired to compare the actual *quantity* of mortality in any given period of time with some area for which a similar adjustment has been made.—*Resident Tuberculosis Deaths, Monthly Vital Statistics Review, New York State Department of Health, November, 1922, iii, no. 9, 98.*

Lower Tuberculosis Mortality among Colored Policy-Holders.—With three-quarters of the year passed, the favorable situation with reference to tuberculosis still remains the outstanding feature of this remarkable health year; but an interesting element of the tuberculosis record of 1922, to date, is that the improvement in the gross rate this year is due almost entirely to another decline among colored policy-holders. The tuberculosis death rate of the whites (101.2 per 100,000) is almost identical with last year's rate of 101.9, but the figure for the colored dropped from 278.7 in 1921 to 255.6 this year. Another feature of the tuberculosis situation is that, for the whites, even the fractional decline recorded is due to lower rates for tuberculosis of the meninges and for other forms of tuberculous disease rather than for pulmonary tuberculosis, for which a fractional increase was recorded; among colored policy-holders declines are in evidence for all forms of the disease.—*Mortality Experience of First Nine Months of 1922, Statistical Bulletin, Metropolitan Life Insurance Co., October, 1922, iii, no. 10, 4.*

Tuberculosis among Colored Race in New York City.—The number of colored people in New York City is now estimated at 168,000. The city's population therefore includes one colored citizen for each thirty-five whites. As is well known, the death rate from tuberculosis among the colored people, under city life conditions, averages three times that of white persons. The colored elements now furnish in New York City one death in each twelve from tuberculosis. The accompanying table furnishes the detailed figures since 1910 of tuberculosis mortality among the colored and white populations of New York; and the diagram compares graphically the two rates. During the twelve years, 1910 to 1921, inclusive, reported here, the colored race in New York has lost from tuberculosis alone 7,337 members. In 1910 the mortality rate per 100,000 inhabitants was 202 among the white and 617 in the colored population. Both rates, of course, have declined markedly since that time. In fact, they have been reduced 52 per cent, being, respectively, in 1921, 97 among the white and 299 among the colored. It is interesting to note that the decline of 48 per cent since 1910 in the tuberculosis death rate of the colored has been almost as great as that of the white population which amounted to 52 per cent.

Tuberculosis mortality among the colored and white populations in New York since 1910*

YEAR	NUMBER OF DEATHS		DEATH RATE‡	
	Colored	White†	Colored	White†
1910	522	9,552	561	204
1911	594	9,656	598	202
1912	588	9,393	557	193
1913	595	9,436	532	191
1914	645	9,645	546	192
1915	653	9,596	486	189
1916	574	9,074	440	175
1917	580	9,562	424	182
1918	642	9,456	449	177
1919	706	7,792	471	144
1920	597	6,538	384	119
1921	484	5,438	299	97

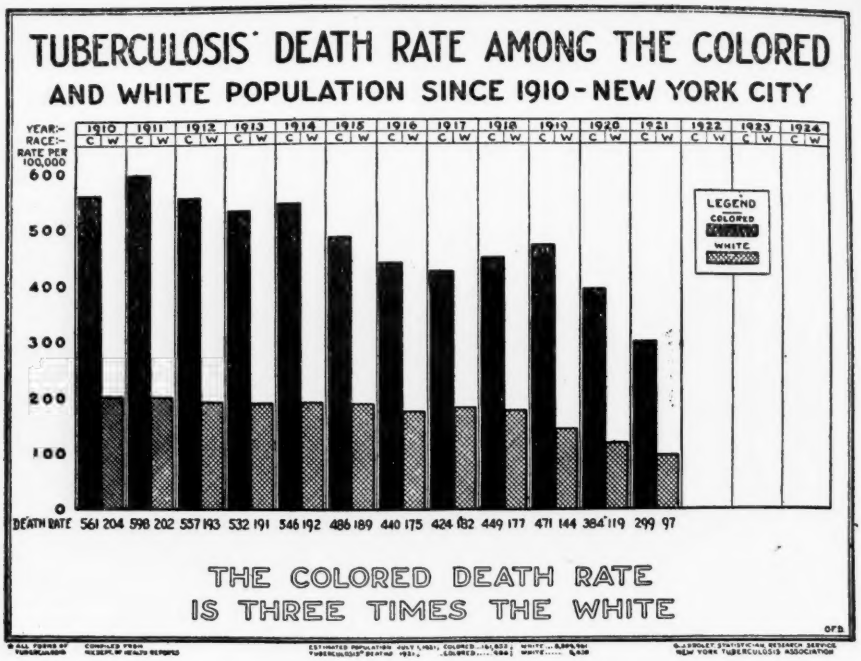
Compiled from N. Y. Department of Health Reports.

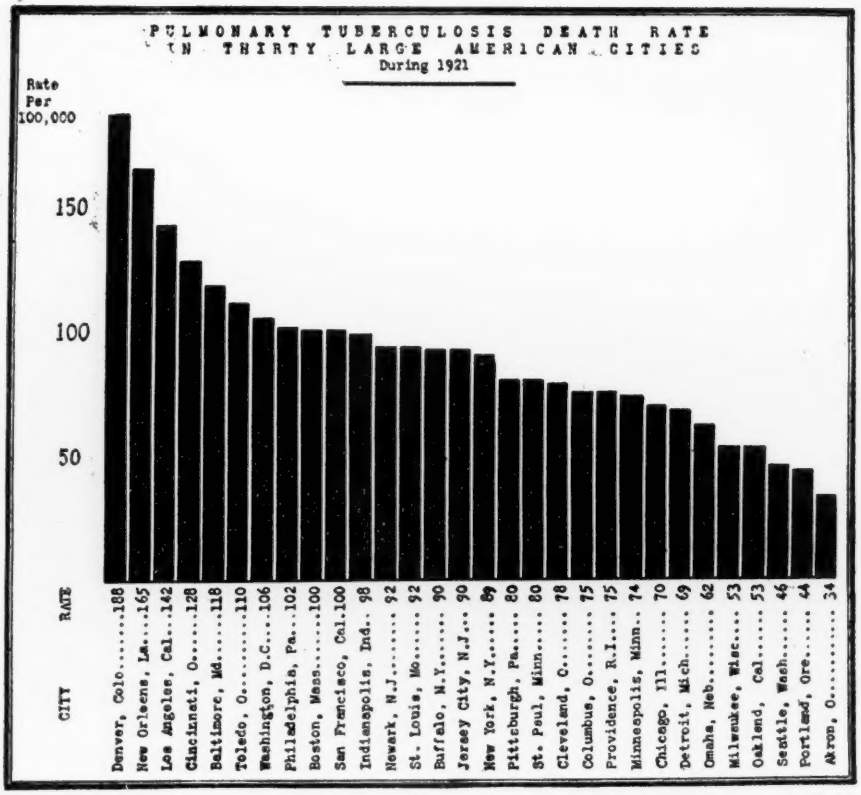
* All forms of tuberculosis.

† Includes all population other than Negroes.

‡ Per each 100,000 population.

The annual differences in the death rates show a more marked effect upon the colored during winters of especial severity, as in 1919. Since the colored population of the city has included of late years quite a proportion of members from the West Indies, and since these do not, as yet, stand so well the colder climate, there is more illness among them during severe winters. The majority of the colored people in New York are at present concentrated in Manhattan in the Harlem Tuberculosis Clinic district around Lenox Avenue, and in the middle of the West Side in the Vanderbilt district in the vicinity of the 60's and west of Amsterdam Avenue. A recent study made by the New York Tuberculosis Association of tuberculosis mortality in Manhattan by sanitary areas showed that the highest number of deaths during the period 1915 to 1920 occurred in these two Harlem and Vanderbilt districts, and that the smallest decline in the death rate between 1915 and 1920, namely, of only 5 per cent, was in the Harlem district where the death rate from pulmonary tuberculosis was 183 in 1915 and 174 in 1920; whereas in





Compiled by G. J. Drolet, Statistician, New York Tuberculosis Association, from U. S. Pub. Health Serv. Rpts., no. 19, vol. xxxvi, and no. 23, vol. xxxvii.

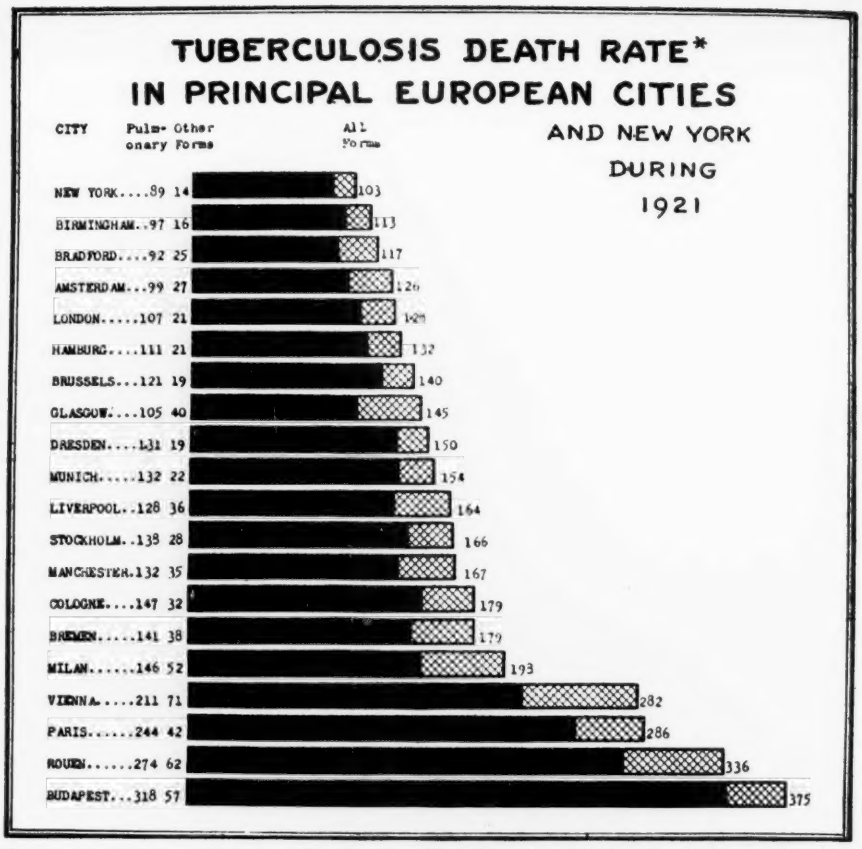
Pulmonary tuberculosis mortality in thirty large American cities during 1920 and 1921

CITY	POPULATION JULY 1, 1921	PULMONARY TUBERCULOSIS				Per cent decrease in 1921
		Number of deaths		Rate per 100,000 Inhabitants		
		1920	1921	1920	1921	
New York, N. Y.	5,751,867	6,165	5,143	109	89	18.3
Chicago, Ill.	2,780,655	2,275	1,935	83	70	15.7
Philadelphia, Pa.	1,866,212	2,130	1,912	116	102	12.1
Detroit, Mich.	1,070,450	849	736	83	69	16.9
Cleveland, Ohio	831,138	727	650	90	78	13.3
St. Louis, Mo.	786,164	654	723	84	92	†9.5
Boston, Mass.	757,634	813	760	108	100	7.4
Baltimore, Md.	750,864	936	889	126	118	6.4
Los Angeles, Cal.	614,160	926	870	157	142	9.6
Pittsburgh, Pa.	602,452	562	481	95	80	15.8
San Francisco, Cal.	520,546	557	520	109	100	8.3
Buffalo, N. Y.	519,608	455	466	89	90	†1.1
Milwaukee, Wis.	468,386	322	246	70	53	24.3
Washington, D. C.	437,571	492	463	111	106	4.5
Newark, N. J.	424,885	470	392	113	92	18.6
Cincinnati, Ohio	403,418	544	518	135	128	5.2
New Orleans, La.	394,657	745	650	191	165	13.6
Minneapolis, Minn.	392,815	353	289	92	74	19.6
Indianapolis, Ind.	325,632	336	319	106	98	7.6
Seattle, Wash.	315,312	194	145	61	46	24.6
Jersey City, N. J.	302,788	305	274	102	90	11.8
Portland, Ore.	264,859	155	116	59	44	25.4
Denver, Col.	263,152	720	494	278	188	32.4
Toledo, Ohio	253,696	295	280	119	110	7.6
Columbus, Ohio	245,358	217	183	90	75	16.5
Providence, R. I.	239,645	212	179	89	75	15.7
St. Paul, Minn.	237,781	206	191	87	80	8.1
Oakland, Cal.	226,472	190	121	86	53	38.4
Akron, Ohio	208,435	88	71	41	34	17.1
Omaha, Neb.	197,066	122	123	63	62	1.6
Total	22,453,678	23,015	20,139	104	90	13.5

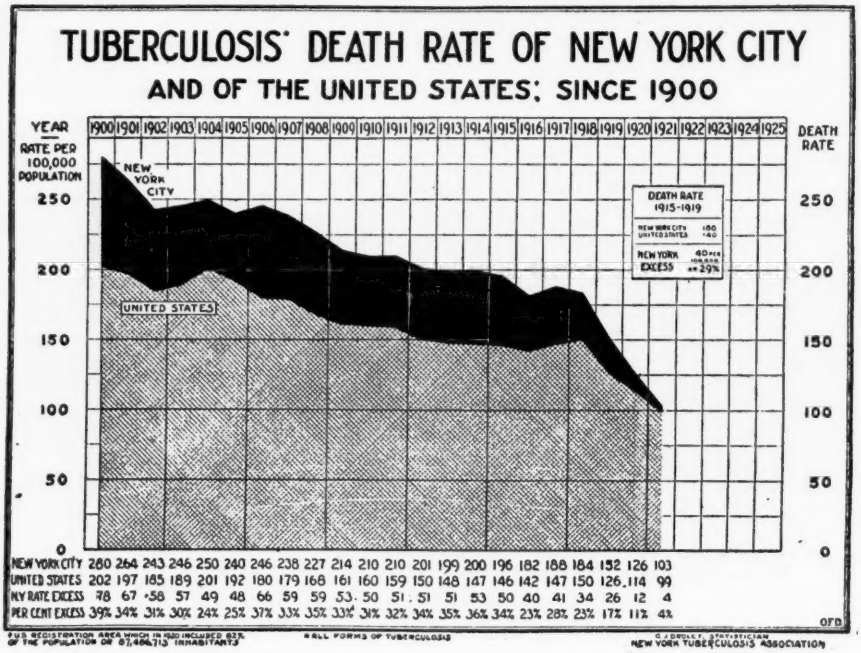
† Increase in 1921.

the city at large it averaged 109. The morbidity rate from pulmonary tuberculosis in 1921 was 614 per 100,000 in both the Harlem and Vanderbilt districts, as against an average of 477 for New York City at the same time.—*Tuberculosis among the Colored, G. J. Drolet, New York Tuberc. Assoc. Bulletin, September-October, 1922, iii, no. 4, 12.*

Tuberculosis in Large American Cities.—There are thirty cities in the United States with a population of, or exceeding, 200,000 inhabitants. These cities have a total population of twenty-two and a half millions, and in them, therefore, live one-fifth of the people of the entire country. In 1920 and 1921 there died, in these thirty cities, 43,254 people from pulmonary tuberculosis alone. If, in addition to this death toll, we were to include also the number dying from tuberculosis of other forms than pulmonary, the total would reach 50,000 victims. In these thirty cities there were approximately 3,000 fewer deaths from tuberculosis in 1921 than in 1920. Details are given in the accompanying table. The death rate from pulmonary tuberculosis in 1920 was 104 per 100,000 inhabitants, whereas in 1921 it was 90, a decline of 14 per 100,000 during the year and a decrease in the death rate of 13.5 per cent. In general, when studying mortality returns from tuberculosis in cities in this country, the following cautions should be observed: *First*, that the total deaths reported are probably an understatement because of the frequent removal of consumptives from large towns to the health resorts, though in the



*Figures by Courtesy of Bureau of Records, New York Department of Health. * Per each 100,000 inhabitants. Chart by G. J. Drolet, Statistician, New York Tuberculosis Association.*



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present list of cities the inclusion of places like Denver and Los Angeles restores to the total figures a certain number of these deaths. However, many deaths of residents coming from large cities also take place in Arizona and New Mexico or smaller health resorts like Colorado Springs and in the Adirondacks. Against this loss in the city figures, there may, however, be a partial balancing by the indefinite but common movement of sick persons from small towns into larger hospitals within cities, because of the relative insufficiency of medical or institutional treatment in smaller communities. *Second*, caution is to be exercised against cities that have municipal institutions for the care of the tuberculous outside of their own limits. This particularly applies to the figures reported from St. Louis and Baltimore. Of course, the returns from health resorts like Denver and Los Angeles are not alone representative of the incidence of merely local tuberculosis. *Third*, a comparison is still further made difficult by the varying proportions of the colored population, especially in the southern cities as against the northern. The colored race in general has an incidence of tuberculosis averaging three times as high as that of the white population. Against this difference, however, are the interesting figures quoted by Bushnell of mortality from consumption in Charleston, S. C., from 1822 to 1900, which show that previous to 1865 the death rates of the colored and white population in that city were practically identical. The statement, therefore, of a difference in tuberculosis rates in cities because of the presence of the colored population, may explain, but does not excuse, the situation. Finally, it must be added that for the same cities the rates of different years are generally comparable because of presumably similar conditions existing at least for short periods of time. When studying tuberculosis death rates in American cities, therefore, the finer differences in the figures may not be accepted; but, on the whole, with the preceding reservations in mind, the relative distribution of higher and lower tuberculosis mortality is fairly and generally correctly represented in the preceding diagram, showing the death rate in large American cities during 1921. There will be noticed, for instance, a death rate in New Orleans of more than four times that of the smallest city in the list, namely, Akron, O. Low rates in cities in the states of Washington and of Oregon confirm similar reports of a general low mortality, in that section of the country. Detroit, with its large numbers, but on the average better-paid workingmen, has the low rate of 69. New York stands midway with a death of 89, being sixteenth in rank among the thirty cities. As compared with the year before, the tuberculosis death rate of 1921 showed a decrease in all the cities except Buffalo and St. Louis. A decline of more than 15 per cent (and therefore above the average reduction during the year) occurred in fourteen cities. The decline in New York City was 18.3 per cent. The tuberculosis record in American cities therefore, while still of tremendous importance and seriousness, is one of hopefulness and of constant progress against the disease.—*Tuberculosis in Large American Cities, G. J. Drolet, New York Tuberc. Assoc. Bulletin, September-October, 1922, iii, no. 4, 3.*

Etiology of Tuberculosis.—Primary infection in tuberculosis is easily accomplished and only exposure is required, but the disease tuberculosis results from repeated contacts with the bacillus either from the focus within the body or from outside sources. Primary infections are usually benign, probably because dosage is small rather than because of a low virulence of the infecting bacilli. Bovine bacilli cause 10 or 12 per cent of deaths from tuberculosis in children under fifteen but are rarely the cause of pulmonary tuberculosis. There is, however, no evidence of a transformation from bovine to human type. The chief source of infection is human sputum and the modes of infection are various—inhalation, ingestion, contaminated hands to mouth, etc. The danger from spray of the coughing patient is not as great as it has been thought to be and is "reasonably controllable by education." Danger from contaminated dust may be considerable if the bacilli remain in clumps which do not completely dry, but not otherwise. Reinfection is frequently favored by pregnancy, by the onset of puberty or by the "physical and mental strain in youth" and adolescence when prolonged effort, circulation acceleration, excessive muscular activity and increased depth of breathing, exhaustion from over-study, loss of sleep, anxiety, etc., may make for mobilization or spread of bacilli. Persons with certain hereditary characteristics, physiques and habits are more likely than others to succumb, as are also the malnourished, especially those with a low protein and low fat diet. Adult tuberculosis, with few exceptions, arises from first infections and reinfections before the age of twenty-one. Certain occupations may predispose to tuberculosis, but it is more likely that they activate latent disease since most people

begin work while they are still in the infection age and are still becoming infected.—*The Etiology of Tuberculosis in its Modern Aspects, E. R. Baldwin, N. York Tuberc. Ass. Bull., 1922, iii, no. 5, i.*

Cough Droplets in Etiology of Tuberculosis.—After long experimentation the author developed a method by which he was enabled to study the distribution of cough droplets under all conditions. Non-absorbent dry paper is covered with a 2 per cent solution of ferrous sulphate. After drying, potassium ferricyanide, finely powdered, is rubbed in evenly in the paper. A blue spot is left on the surface if it comes in contact with moisture. Even the smallest drops of 10 micra in diameter are registered on the paper. The following facts were brought out by this study: The number of droplets depends on the expiratory force of the cough. The droplets are more numerous in stronger patients, more in the morning, less in the afternoon and increasing again toward evening. The majority of the droplets are from 100 to 500 micra in diameter, though some measure 10 micra. One-third to one-fourth of all droplets are of bronchial origin. The droplets in coughing spread on a direct or only slightly oblique line from the mouth. The majority of the drops travel 30 to 35 cm., though some travel 1.5 metres. Droplets of 100 micra in diameter sink to the floor in less than five seconds. Whether smaller drops sink to the floor more rapidly could not be ascertained as they dry out before they reach the paper surface. In sneezing the number of droplets is far greater than in coughing, and they are thrown, on the average, 1.25 metres from the patient. Some are thrown as far as 3.5 metres. No droplets are present in the expired air without coughing. In ordinary conversation the droplets are thrown, on the average, 25 to 30 cm. from the mouth. Tuberculous infection through droplets, which are breathed in into the lungs, is possible, and the possibility increases the longer the individual is exposed to the droplet spray. The number of tubercle bacilli in cough droplets is less than in the expectoration and the bacilli in the former are more finely divided. The presence of the bacilli in droplets can be demonstrated only in those of bronchial origin. They are more numerous in the tuberculous who suffer from an acute catarrh. Tuberculosis patients without a catarrhal condition have practically no bacilli in their cough droplets. The author considers every coughing tuberculous patient a source of grave danger. He advises installation of vessels with disinfecting material in their rooms, so that they may cough in that direction.—*Hustentröpfchen und Tuberkulose-infection, Seiffert, Ztschr. f. Tuberk., 1922, xxxvi, 549.*

Tuberculous Infection.—Dust infection plays a subordinate part in the infectiousness of tuberculosis, not to mention tonsil and intestinal infection from foods. The main rôle is taken by droplet infection. *Über die Tuberkulose-Ansteckung, F. Hamburger, Beitr. z. Klin. d. Tuberk., March, 1922, l, 162.*

Tuberculosis a Deficiency Disease.—Tuberculosis and rickets are closely connected and, as the latter is best prevented by providing the pregnant and nursing mother or the cow with proper food, so similar methods may be expected to be of value in combatting the former. Foods containing fat-soluble vitamine A were hard to procure during the war, which may have had something to do with the recrudescence of tuberculosis at that time. A pregnant mother may eat sufficient vitamine-containing foods but, if she suffers from continued vomiting, they may not be absorbed; likewise, a child's assimilation may be greatly retarded by an attack of gastroenteritis, and in such events rickets is likely to appear. Bone malformation, dental caries and tuberculosis seem to come in the same category. It may be the lack of milk rather than the ingestion of tuberculous milk that determines active infection. In native races, epidemics of tuberculosis are usually attributed to lack of hereditary and acquired immunity; but it is possible that the vitamine content of their diets may be a causative factor. In tuberculous families, also, there may be some dietary deficiency, in addition to the high risk of infection, to explain why their members succumb so readily. Such a factor may have a part in accounting for the varying susceptibilities of wild and domestic animals. Tuberculosis has increased among the fishermen of Norway since the advent of the steamer with longer journeys, closed cabins and the introduction of preserved milk and other foods. An abundant supply of fat-soluble vitamine to the developing child, before and after birth, should be a part of every anti-tuberculosis campaign, and efforts might better be directed to the cleansing of milk-production plants and the improvement of the feeding of cattle rather than to the tuberculin testing of herds.—*Tuberculosis as a Deficiency Disease, V. F. Soothill, Tubercle, December, 1922, iv, 108.*

Tuberculosis and Poison Gas.—Mustard gas is the only gas considered because it was almost exclusively used against the American forces, as it is the most effective of all battle gases in producing casualities. In reality, the so called mustard gas is not a gas but is a heavy oil thrown in shells. Great extent of terraine can be contaminated for long periods of time. It volatilizes with difficulty and only under warm sunshine. Any troops going into such areas are burned (gassed). It is usually not inhaled. Other types of gas, like phosgene and chlorine, are vastly more deadly, but are only effective in such high concentrations; hence, in such a restricted area as to be very ineffective as compared to mustard gas. Chest examination of those gassed by mustrard gas usually revealed nothing. Except in a relatively few cases, there was no possible relationship between the lung condition found and exposure to the gas. The percentage of deaths in the gas hospital was 1.98 per cent, all from mustard gas. In those cases autopsied no evidence of reactivation of existing tuberculous lesions was found. It seems, however, true that a man who has once been gassed has come to attribute any illness from pain in the chest, shortness of breath, acute bronchitis or tuberculosis, to his gassing. Yet it is inconceivable that gas could reactivate tuberculosis, and available statistics and majority expert opinion go to prove that it does not do so. This view is endorsed by French, British and other authorities.—*Tuberculosis and Poison Gas, A. P. Francine, N. York. M. J. and Med. Rec., January 3, 1923, cxvii, 25.*

Late Effects of Gas Poisoning.—A review is made of 83 recognized cases of gas poisoning with a duration of four to seven years. Chlorine, phosgene and mustard gas are the common etiological agents. The symptoms complained of are: (1) shortness of breath on exertion, present in 70 per cent, (2) cough and expectoration in 54 per cent, (3) pain or a feeling of tightness across the chest in 25 per cent, (4) palpitation and occasional giddiness in 14 per cent, (5) morning vomiting or nausea with want of appetite in 12 per cent, and (6) headache, nervousness, insomnia, tremulousness, want of energy, lacrimation, etc., in less than 10 per cent. *Conclusions:* 1. Not one of this group admits that he has fully recovered and suffers no ill effects. 2. The disability will be permanent; treatment on the usual lines will not differ from that of cases of emphysema and bronchitis in ordinary civil life. 3. Pulmonary tuberculosis is not a common effect of gas poisoning, and is certainly not one of its later effects. 4. In 45 per cent of the cases there is definite tachycardia; of these, 85 per cent showed nothing abnormal on examination of the heart.—*The Later Effects of Gas Poisoning, T. E. Sandall, Lancet, October 21, 1922, cciii, 857.*

Tuberculosis and Pregnancy.—Pregnancy, far from being always disastrous for tuberculous women, is frequently without influence on and may even be favorable for the evolution of tuberculosis. Improvement during pregnancy is presumably due to the cessation of menstruation and the continual monthly exacerbations of tuberculosis that accompany the latter. It is, therefore, advisable to protract the non-menstrual period by nursing the child when this can be done without risk. The type of disease in which pregnancy is most likely to be favorable is that of chronic fibrous cases. In these it is legitimate to permit pregnancy. Abortion is inadmissible; if the pregnancy begins favorably the chances are against rather than for a premature interruption; if the tuberculosis becomes worse, abortion will not save the mother; intervention is justifiable only when, with a living child, the mother is in danger of death. The children of tuberculous parents have a special value as bearers of immunity. Through them the progressive immunization of races is accomplished. This is brought about especially through children of parents with fibroid tuberculosis, a form already attenuated by heredity. Only through the production of such immunized persons may we hope for the elimination of tuberculosis. The practice of artificial pneumothorax has introduced a new, favorable element into the problem of authorizing a pregnancy during tuberculosis.—*Grossesse et Tuberculose, F. Dumarest and P. Brette, Presse Méd., June 21, 1922, xxx, 531.*

Tuberculosis and Pregnancy.—Tuberculosis of Turban I and II stages are indications for interrupting pregnancy during the first months, except in well-nourished pregnant women of the first stage. Pregnancy beyond the third month contraindicates artificial interruption. The indications for interruption are not fully defined, since in a number of women in whom the pregnancy was carried to term the much feared progression of the tuberculosis did not occur. The case reports of 24 women in whom abortion was not performed for various reasons are given; 7 were examined subsequently, 9 were lost to record, 3 died and 5 answered only by letter. The results were variable. In 3 cases of active tubercu-

losis the pulmonary findings were aggravated by the delivery and puerperium; in one the result was questionable and in another no aggravation occurred. Two cases of latent tuberculosis were aggravated in the puerperium. In 5 cases premature birth occurred, and this seemed to have a favorable influence on the pulmonary tuberculosis. —*Über das Befinden von lungentuberkulöse Frauen, bei denen eine Unterbrechung der Schwangerschaft abgelehnt wurde, G. Hamburger, Zentralbl. f. Gynaek., November, 1921, xlv, 1686.*

Inherited Locus Minoris Resistentiae of Lung in Chronic Tuberculosis.—Observations were made on 222 members of 104 families. In only a few cases could all the children, especially sisters, be examined. In 70 families (67.17 per cent) the seat of the primary development of the chronic pulmonary tuberculosis corresponded. According to these studies and those by Turban, Finkbeiner, Kuthy, Strandgaard, and Mayer, 317 of 444 families with a total of 1013 individuals, 71.40 per cent, revealed the Turban *locus minoris resistentiae*. In 24(34.29 per cent) of the families the disease began during corresponding ages (Brehmer's postulate), and in 16 of these 24 there was a coincident *locus minoris resistentiae hereditarius*—a difference of four years in age is still considered positive in the Brehmer sense. The statements of patients about the age when disease began must be taken with reserve. An agreement in the appearance of complications, pleuritis, otitis, laryngitis, etc., as also fever cases, was not determined. Causes of an hereditary basis are to be looked for in the variable elastic fibre content of the lung (Hess), the fluctuations in the lung content of silicic acid (Schulz-Kobert), the pathological changes (atrophy) of the posterior apical bronchus (Birch-Hirschfeld), and the alkalescence grade of the sputum (Hess). The Freund-Hart idea of calcification of the first rib is refuted.—*Über den Locus minoris resistentiae hereditarius der Lunge bei chronischer Tuberkulose, W. Edel, Beitr. z. Klin. d. Tuberk., March, 1922, l, 167.*

Tuberculous Infection of Newborn.—A case is presented in which the progress of the infection was followed from beginning to end, and which illustrates the care with which a pregnant tuberculous woman must be followed, as well as the precautions necessary to prevent infection of the newborn by its mother. The baby was a male, seven and a half months' gestation, delivery rapid and normal. It was born July sixth. On the twenty-first, the mother was taken suddenly ill with chills, cough and temperature of 40°C. Crackling râles were found over both apices, moist râles throughout. Many tubercle bacilli were found in the sputum. The disease progressed rapidly and the mother died October 11th. The mother's breast milk was shown not to contain tubercle bacilli. The infant was not removed from the breast until July 23, two days after the onset of the mother's acute symptoms. The child was considered to have been infected by the mother's sputum during these two days. The baby was admitted to the *Crèche* July 28th, and did very well on breast milk till August 4th when digestive disturbances began and its weight became stationary. Its Pirquet reaction, negative July 28th, was strongly positive August 8th. It died September 22d, after rapid increase in digestive disturbances, fever and cough. Two days before death, many tubercle bacilli were found in the stools. At autopsy the primary focus was found in a patch of lobular pneumonia at the right base. Both lungs, and the mediastinal nodes were full of tubercles. The mother's history was of interest. Her father and mother were both tuberculous. At the age of two and a half years, she had had dactylitis of the right ring finger and of the left index finger. When three months pregnant she had an attack of hemoptysis. About a month after her delivery, her "galloping consumption" began, her pregnancy having lighted up the old process.—*Infection tuberculeuse du nouveau-né, Ribadeau-Dumas, J. Meyer and Demerliac, Bull. d. l. Soc. d. Pediatrie d. Paris, October, 1922, no. 7, 305.*

X-ray Appearance of Thorax in Stillborn and Newborn.—The development of the respiratory tract is briefly reviewed. In fetal life the lung entirely fills the thorax, but is completely atelectatic. All plates obtained of the stillborn show that the shape of the chest and abdomen is ovoid, the bulging no doubt being the result of the large liver. The lower ribs flare to accommodate themselves to the wide upper abdomen. The upper pole of the thoracic cage is distinctly narrowed. The ribs are sloping. There is an even density throughout both lung fields, and the heart shadow cannot be differentiated from the lung tissue. Immediately after respiration there is a distinct change in the contour of the chest. The ribs elevate and lie at right angles to the spine, and the upper thoracic cage shows a definite increase in the diameter. On some plates the tracheal shadow is shown throughout. This negatives Mink's contention that the fetal air passages are col-

lapsed and that the glottis and nostrils are closed. In cases where insufflation of the lungs of the newborn was done with a gas machine, a gaseous distension of the stomach and intestines was found, but no changes were produced in the lungs. Experiments with the insufflation of the lungs of the stillborn by means of a catheter passed into the trachea demonstrate that it is impossible to inflate the lungs by air pressure. Rather, there is an early rupture with the escape of the air into the pleural cavities which is sufficient to distend the chest wall. Usually pressure equal to 10 mm. of mercury is considered the limit of safety in forcible expansion of the lungs in infancy. It is concluded that insufflation for faulty respiration is ineffective. Often an enlarged thymus is responsible for the faulty respiration; the shadow of the normal thymus gland could not be differentiated from the spine. In unilateral atelectasis in three cases the lobe of the thymus was found more enlarged on the affected side.—*Roentgen Studies of the Thoraces of the Stillborn and Newborn, W. A. Evans, Am. J. Roentgenol., October, 1922, ix, 613.*

Primary Miliary Tuberculosis of Infants.—Between the form of hyperacute miliary tuberculosis and the ordinary form, which appears at varying intervals after the time of infection and undergoes a more or less masked evolution, there is also a type of acute miliary tuberculosis in which the lesions of primary infection and those of miliary tuberculosis develop simultaneously. These cases evolve rapidly in two to three weeks and oftenest terminate in meningitis. They are especially frequent in March and April epidemics. Probably they do not all evolve in the same way and it seems that some may end in recovery. This was the case with two children in whom miliary lesions of this sort were observed after death from an accidental septicemia.—*Granulie initiale dans la tuberculose des petits enfants, Barbier, reported from the Proceedings of the Academie de Médicine, Paris, Section d'Études Scientifiques de l'Oeuvre de la Tuberculose, Presse Méd., June 10, 1922, xxx, 504.*

Normal Infant's Chest on X-ray.—The necessity of obtaining a knowledge of the radiographic appearance of the healthy chest before attempting to endow shadows with pathological significance led to this investigation. This communication deals only with the radiographs of 12 infants from eight days to fifteen weeks, selected as typical examples of health, and all breastfed by healthy mothers. For the exposures duplitized films with double screens were employed, using the same Coolidge tube at a distance of 60 cm. in 7 cases, 55 cm. in 4 cases and 50 cm. in a single case; 25 milliamperes were used and the time of exposure was 0.1 second. The infant was placed on its back, the film behind it. *Summary:* All cases examined showed definite shadows, not homogeneous, within an area extending from the fifth to the eighth rib, and bounded externally by a semilunar line extending about three-sevenths of the total distance from midline to periphery of chest. This area contains the root of the lung.—*The Normal Infant's Chest, J. H. P. Paton and A. Rowland, Lancet, October 14, 1922, cciii, 801.*

Family Placement of Infants of Tuberculous Parents.—Bernard spoke on the safeguarding of young infants by placing them in families. He reviewed the evidence, showing that children of tuberculous parents are generally born without tuberculosis and may even be entirely sound and strong, and that their excessive liability to infection depends upon the intimate contact of the child with infected relatives, above all with its mother. When the mother is tuberculous the age at which symptoms appear in the child varies, but, in general, the more instructed and intelligent the mother and the more anxious she is to protect her child, the longer it may escape. However, he has not seen an infant remain more than six months with a tuberculous mother before presenting signs of the disease. He discussed the difficulties connected with the removal of nurslings from their homes to an environment free from tuberculosis and suitable in other regards, difficulties which are far more considerable than in the matter of placing older children. He described an establishment where an endeavor is being made to overcome these difficulties, and to inaugurate a work which shall do for the very young what the Grancher movement has done for older children. The establishment is a *crèche* belonging to the speaker's service in the Hospital Laennec, a *crèche* founded by Landouzy for the use of tuberculous mothers and their infants, as a means of reducing the danger of infection through the segregation of the tuberculous. In this *crèche* destined only to safeguard healthy mothers and children, tuberculous mothers were not originally separated from their children, and there was a high mortality from tuberculosis among the latter. But, through the influence of the speaker and of Debré, the *crèche* was subsequently transformed into an establishment which undertakes to protect the children of tuberculous

mothers by removing the infants from contagion. The *crèche* serves also as a station for experiment and observation. Where the mother's infection is doubtful, mother and child are both placed under observation, and through this means important information is obtained concerning the relation of the time of infection to other factors, such as breast feeding, intimacy of contact, extent of precautions, etc. As long as the diagnosis is in suspense the mother nurses her child, but with such precautions as wearing a mask and a special dress. If the diagnosis is established, with bacilli in the sputum, breast feeding may be continued if the mother's health permits and the child's condition demands it. But this happens rarely; in the great majority of cases the children have either artificial feeding or, where this is badly borne, they are fed by a wet nurse. But an establishment of this sort, which serves for the care of tuberculous mothers and for keeping their infants apart from them, offers no permanent solution of the child's problem; it cannot remain indefinitely in the hospital *crèche*. Neither can it be placed in a peasant family and left subject merely to occasional medical inspection. Food and the manner of giving it as well as the state of the infant's digestion are matters that require intelligent, continuous supervision. A dispensary especially adapted to this task is consequently indispensable as a centre for the placement of these children. As a result of this need there has been created a society for the placement of very young children. The society has opened a centre at Salbris and two other centres are being formed. Such centres require an especially trained nurse, who will prepare and give out the milk, a physician to make regular inspection of the babies, and a small infirmary where children may be kept for a time in case of illness. The babies are placed in families living within a radius of three kilometres, the selection being made by the physician and nurse. The foster mother is given clothing, a cradle, bedding and a perambulator for her charge. The milk is prepared in the forenoon and the afternoon is occupied in consultation with the foster mothers; both these and the children are inspected daily. The guardians are instructed concerning hygiene, especially upon the importance of keeping the babies out of doors when the weather permits. Once in two weeks all children are weighed and have a medical examination. The physician is subject to call at the dispensary and the houses of the foster parents whenever a child is ill. The nurse communicates by letter or telephone with the Paris office when occasion arises. The society receives children from birth to two years and keeps children to the age of four. If a child remains ill after a fews days' care at the infirmary it is sent to Paris and placed in an appropriate hospital service. When children pass the maximum age and contagion still exists in the family, they are placed by the bureau of public social hygiene in one of the centres for older children. If the family is free from tuberculosis the children are not eligible to this service. The family is then asked to retake the child. In case of refusal an effort is made to get the child adopted. If not cared for in one of these ways the child would become a State ward, a solution that has not been necessary for any of the 26 children who have so far quitted the centre. Seventy-seven children have been cared for; two have died. This low mortality is all the more remarkable in that not all of the children received were entirely free from signs of tuberculosis; positive skin reactions sometimes betrayed arrested or occult forms of the disease. The two fatal cases belonged in this category. Inasmuch as nurslings exposed to a constant source of infection almost invariably contract tuberculosis, and as this is almost inevitably fatal in the very young, it may be claimed that the society has been the means of saving all but 2 of these 77 children. The extension of the work seems, therefore, an important factor in the struggle against tuberculosis. In the matter of establishing placement centres, however, the requirements for success should be insisted upon. Centres must be in regions where the population is sufficiently intelligent and instructed to furnish suitable homes for the children. The milk supply must also be good and accessible; there must be a local physician interested in and properly trained for the work of medical supervision; a competent nurse, willing to reside at the centre, must be available. Moreover, the central administration must insure intelligent selection and attentive, continuous control. Imperfection in any of these indispensable requisites would furnish a fruitful source of disaster. The cost, 6 fr., 51 centimes, a day, ought not to be included among the genuine difficulties of carrying on a work of such importance.—*La préservation de la premiere enfance contre la tuberculose par le placement familial, L. Bernard, Cong. Ann. d'Hyg., Paris, November 3–8, 1921, reported in Rev. d. l. Tuberc., 1922, iii, 28.*

Tuberculosis of Ear in Infancy and Childhood.—One of the frequent causes of discharging ears in children is tuberculosis. This is a very serious condition which may be acute or chronic. The changes in the ear may range from infiltration of the mucous

membrane to necrosis of the temporal bone and destruction of parts of the ear; it may, of course, result in fatal meningitis. The bacteriological examination should be thorough; the tubercle bacillus is difficult to find, and even in material curetted from tuberculous cavities it may be absent. It is found more easily in acute than in chronic stages. Statistics show that, in cases of purulent otitis media under two years of age, 27 per cent, and, in cases under one year, 50 per cent are due to tuberculosis. The disease may also occur at later perods of life, notably in advanced stages of pulmonary consumption. Tubercle bacilli were found in cases of purulent otitis media occurring in adult patients with long-standing phthisis. Primary tuberculosis of the meatus has been reported as a result of digital infection. In treatment, syringing should be avoided, also frothing reagents which might spread the infection. In case of operation, removal of affected structures should be thorough.—*Aural Sepsis in Infancy and Childhood, W. Stuart-Low, Practitioner, July, 1922, cix, 57.*

Tuberculosis in Children.—There are three distinct types of tuberculosis in children, namely, the general or infantile, the hilum or juvenile, and the apical or adult form. The infantile form assumes the characteristics of an acute infectious fever and progresses rapidly to a fatal termination as general miliary tuberculosis, meningitis or bronchopneumonia; it is usually seen before the age of two years, and children over five years of age rarely develop this type. From five to twelve years the lymphoid type of tuberculosis predominates and the mortality is low; the hilum lymph nodes are especially liable to involvement. Apical lesions or the adult type of tuberculosis rarely occur before the age of twelve years. It is important to recognize hilum tuberculosis because it occurs at a period when resistance is relatively high and when treatment yields good results. In the transitional period, from two to five years, danger lurks because of the frequent paucity of definite symptoms, the child often showing good development and color. Another dangerous transition occurs after the age of twelve, when the adult type of disease becomes prevalent and hilum disease relatively infrequent. In examining patients, one should remember that the juvenile type is usually deep-seated and confined to the hilum lymph nodes while the adult type of lesion most often lies in the peripheral parenchyma of the lung. In early tracheobronchial tuberculosis, therefore, auscultatory signs may be negative or indefinite; râles are not heard, and breath changes are detected in the infraclavicular triangle and along the vertebral borders of the scapulae only after the disease progresses peripherally. If râles are numerous in any part of one or both lungs of a child from five to twelve they are probably due to some nontuberculous infection; if they are due to tuberculosis, it is a case in the advanced stage. Percussion is of great value in determining hilum consolidation. The child to be examined should be standing, with shoulders sloping slightly forward and with all the muscles of the shoulder girdle in complete relaxation. Light percussion is used with dependence for values placed more upon the tactile than the auditory sense. An impaired note due to muscle spasm may be encountered as a reflex over the upper thorax posteriorly in the presence of treacheobronchial disease; parenchymal involvement may be ruled out when resonance is normal over the apices anteriorly and râles are absent. Symptoms are of great significance in tuberculous children. In order of importance these include fatigue or weakness, anorexia, failure to gain or loss of weight, tendency to profuse perspiration and fever. In hilum tuberculosis fever is transitory and occurs only after unusual exercise or fatigue from any cause. A purely tuberculous disease produces only a low grade of fever; an afternoon temperature not above 99.6° may be considered within normal limits and a temperature of 101° or more is usually due to some nontuberculous cause. A child's pulse cannot be used as a criterion in early diagnosis. The intradermal tuberculin test is used; an initial dose of 0.01 mgm. tuberculin is given, followed, if there is not reaction, by a dose of 0.1 mgm. Long continued exposure to a source of infection is an important etiological feature although 34 per cent of a series of 200 tuberculous children under observation gave no history of such intimate contact in the home. A history of frequent colds or predisposing causes such as measles, whooping cough and influenza is important. The frequent association of phlyctenular disease and scrofuloderma with hilum tuberculosis should be remembered. In a child showing enlargement of the bronchial lymph nodes with thickening of adjacent tissues, accompanied by symptoms of tuberculin toxemia, together with a positive intracutaneous test, a diagnosis of hilum tuberculosis should be made.—*Tuberculosis in Children from the Standpoint of the Internist, H. D. Chadwick, Boston M. & S. J., September 28, 1922, clxxxvii, 467.*

Tuberculosis in Children.—The Pirquet test is of great value in diagnosis in infants,

but of less value in children the older they grow. However, a negative test practically rules out tuberculosis, unless the child is evidently overwhelmed by some infection. The test is usually negative in acute miliary tuberculosis and in tuberculous meningitis, and sometimes in tuberculous peritonitis. Great care must be taken in calling pulmonary lesions tuberculous simply because the tuberculin test is positive. The presence of tuberculides, small dark red papules, is evidence of an active and usually a generalized infection; they are most often found in just the cases in which the tuberculin test is negative, and their presence usually presages a fatal termination. The term *pretuberculous stage* is one of doubtful significance. It is a mistake to consider that every child who is delicate or poorly nourished or has a continued fever is tuberculous. In fact, tuberculosis is seldom the cause of their delicacy or malnutrition and a careful study should be made of their parentage, diet and mode of life. The least probable cause of a continued fever in infancy and childhood is tuberculosis; in fact, many apparently well children have a temperature somewhat higher than what is ordinarily considered normal in the afternoon. Available figures indicate the relative infrequency of active tuberculosis in childhood. Tuberculosis in infancy is most often seen as a generalized disease, either acute miliary or chronic diffuse tuberculosis. The latter condition is of longer duration, lasting months rather than weeks, and characterized by tuberculous lesions in many in all organs, but much fewer in number than in acute miliary tuberculosis. Tuberculous bronchopneumonia is also a common form of tuberculosis in infancy. There is usually nothing about the onset of the process to suggest its tuberculous nature and the physical signs do not differ essentially from other bronchopneumonias; but where the process is of unusually long duration and shows no signs of clearing, tuberculosis should be suspected. Infantile tuberculosis while always grave is not invariably fatal. *Local Tuberculosis:* 1. Cervical adenitis: In general, nodes which enlarge rapidly after an acute throat infection are not tuberculous, while those which enlarge slowly and progressively usually are so. Tuberculous cervical nodes tend to remain as localized infection. Regarding treatment, it seems wise, unless they are broken down, to take out the tonsils first, and later the diseased nodes unless they subside, which rarely happens. 2. Tracheobronchial adenitis: These lymph nodes are probably more often involved than any other group. Important physical signs are extension of the bronchial voice, whisper and respiration below the seventh cervical spine, a postphonal whisper over the spinous processes (D'Espine's sign), dulness on percussion below the seventh cervical spine and interscapular dulness; the last named sign is not obtained unless the enlargement is considerable. 3. Pulmonary tuberculosis: In early life this almost always starts at the roots of the lungs and extends outward and downward. Cavitation is unusual; cavities which are found in children are usually due to bronchiectasis or lung abscess. It must not be assumed that every prolonged process in the lungs in infancy and childhood is tuberculous; such are frequently influenzal. 4. Abdominal tuberculosis: The ascitic, caseous and adhesive types of tuberculous peritonitis may be distinguished; their prognosis is better than formerly supposed and operation is advisable only in the ascitic type when it has failed to yield to medical treatment. The advisability of administering or withholding fat depends on whether the mesenteric glands are involved and must be determined by examination of the stools. 5. Meningeal tuberculosis: There is nothing characteristic about the early symptoms. The flaccid type is almost as common as the spastic. It is true that a very few have apparently recovered from tuberculous meningitis, but the number of these cases is so small we are not justified in holding out any hope. Lumbar puncture has no curative action but affords more symptomatic relief than anything else. 6. Surgical tuberculosis: The possibility of tuberculosis of bones and joints must be borne in mind when various aches and pains are complained of, and a routine examination of the spine and extremities is highly desirable. *Treatment:* The preventive treatment is most important. The Rollier sunlight treatment is undoubtedly valuable in tuberculosis of the bones and peritoneum. Tuberculin is apt to be disappointing and is probably much less generally used at the present time than a few years ago.—*Tuberculosis in Children from the Standpoint of the Pediatrist, J. L. Morse, Bost. M. & S. J., September 28, 1922, clxxxvii, 463.*

Tuberculosis in Children.—Although tuberculosis in childhood abounds, it has never received the attention in England that it deserves. Studies like those of Naegeli and Pirquet have shown tuberculous infection to be wellnigh universal, and the "notified incidence" of tuberculosis (all forms) among children (persons under sixteen years of age) is not greatly different from that for all persons, but the preponderance of "other forms" over "lungs" is in

sharp contrast to the state of affairs in adult life. Recently there has been a marked drop in the number of reported cases and in the deathrate of children. Lung, lymphatic and meningeal cases show a family history of tuberculosis more often than do other forms. Localization is in lymph nodes, irrespective of portal of entry; and dissemination of bacilli from foci, while not understood, is often associated in some way with certain diseases (measles, whooping-cough, etc.). *Lymph node forms* are among the most common types of the disease. These comprise: (a) *tracheobronchial*, where inhalation infection is suggested and where the microörganism is the human type; (b) *abdominal*, where the source is ingested food and the bacillus the bovine type in one-half of the cases; and (c) *cervical*, where tonsils and carious teeth are thought to be the chief portals of entry. In these cases the bovine bacillus is frequently found. Reported cervical node cases (in Newcastle-upon-Tyne) are 50 per cent lower than in 1914–1916, the cases are less severe, and the associated scrofulous manifestations are less frequent. Of the cases reported for the last nine years from this district, the cervical node cases are followed by lung tuberculosis more often than are bone, joint, etc., cases. Lung forms in young children are more commonly miliary and bronchopneumonic and, in adolescence, are twice as frequent in girls. Meningitis is the most common cause of death from tuberculosis in children of preschool age. This form is not decreasing. Other forms, abdominal, bone, joint, skin and genitourinary are met with in children. Children usually respond well to proper treatment in sanatoria, special schools, etc. Prophylaxis should aim at controlling sources of infection such as sputum and cow's milk. The splendid work of the Grancher Institute is worthy of consideration and emulation. The desideratum is a method of vaccination, and there are some signs which point favorably in that direction.—*Tuberculosis in Childhood, W. H. Dickinson, The Medical Officer, July 1, 1922, xxvii.*

Discrepancies in Tuberculin Testing in Children.—In studying the genesis of phthisis in childhood, it is important to know how many persons are infected at this period of life and the fate of the child later in life. Official morbidity returns are totally misleading as to the real frequency of the disease in childhood. A study of mass investigations that have been carried out with the Pirquet test in three North European countries discloses two important facts: (1) that even in the first years of life the number of infected children is great, and (2) that the differences in the findings of the various investigators are so great that doubts arise as to the reliability of the methods employed. Experiences of the last few years and available statistical information show that the Pirquet test is subject to important inconsistencies. There may be unknown sources of error in the test and there is evidence to suggest that irregular reactions depend on variations in the tuberculins used. A far more reliable and delicate test is Mantoux's intracutaneous reaction. In many cases a positive reaction is noted where the Pirquet test is negative; and results obtained suggest a far higher incidence of tuberculosis in children than has hitherto been suspected. This observation is of the greatest importance, not only because it shows us that the technique of the tuberculin test requires improvement, but also just as much because it shows us that the allergy of children who have been infected by tuberculosis varies greatly. It is desirable to follow the fate of a group of children through a long series of years, testing their tuberculin sensitiveness by reliable methods, and simultaneously observing any clinical manifestation to which infection gave rise; and, if the ultimate fate of these persons could be included in these observations, a sure foundation would be laid on which we could build up our knowledge of the genesis of phthisis in childhood.—*Methods of Demonstrating the Genesis of Pulmonary Tuberculosis in Childhood, A. Brinchmann, Tubercle, November, 1922 iv, 62.*

Tuberculin Tests in Children.—*1. Comparative Activity of Tuberculin Preparations:* In testing over 1200 children with tuberculins, both human and bovine, discrepancies were noted between the results obtained and those reported by other authors. Hence a comparative study was made of the activity of different preparations of human O. T. There is no existing method of standardizing tuberculin. The activity of a preparation can be ascertained only by trial. In the children upon whom this study is based tuberculin was applied both by the Pirquet method and by the intracutaneous method of Mantoux, both methods being employed on every patient. For the intracutaneous tests a dosage of approximately 0.1 mgm. was given. With "no. 1" tuberculin (commercial) positive results were obtained in only 24 per cent, the average age being 6.6 years; "no. 2" (commercial)) gave 36.2 per cent positives, the average age being 6.8 years; and "no. 3" gave 47.1 per cent positives, the average age being 7.5 years. This tuberculin was

from the Saranac Lake laboratory. A further series of tests was made to include samples of tuberculins from other manufacturers, and three more commercial tuberculins were obtained. The Pirquet test alone was used and simultaneous tests were performed upon 25 adults and 3 children whose reactions were known to be positive and the tuberculins were graded according to percentage positive and according to the severity of the reaction when present. The Saranac preparation, "no. 3," was found to distinctly exceed any of the five commercial products, not only in the number of actual positives but in the severity of the reactions produced. The commercial products were found to vary greatly from each other in activity, and were without exception inferior preparations. *2. Incidence According to Tuberculin Tests:* A study was made to determine to what extent care of technique, aided by a combination of cutaneous and intracutaneous methods and selections of tuberculin, may give value to the results of tests performed at one sitting and completed in one return visit after forty-eight hours. The number of children tested was 346, and four simultaneous tests were performed on each child: two Pirquet tests with human O. T. (Saranac) and two intracutaneous, one with this tuberculin and the other with bovine tuberculin (commercial), the dosage being 0.08 mgm. Full strength human O. T. was used in the Pirquet scarifications which were made with the usual borer through the drop of tuberculin. Positive reactions were obtained in 57.1 per cent and the average age was 8.1 years. The results of these tests indicate that a combination of the Pirquet and the intracutaneous methods may be used to advantage where it is desirable to test at one sitting. The Pirquet method alone would have demonstrated 85 per cent of all these cases of infection detected by the combined method. *3. Incidence of Lymph Node Enlargement with Regard to the Tuberculin Reaction:* The lymphatic structures selected for this study were the anterior cervical, epitrochlear and peribronchial nodes. The 165 children examined gave 88 positive reactions when tested with the combined Pirquet and intracutaneous methods, using Saranac tuberculin. The frequency of the enlargement of the anterior cervical nodes was practically the same, whether the tuberculin reactions were positive or negative: 57.9 per cent in the positive and 58.4 per cent in the negative cases. Of the 88 children who reacted to tuberculin, 31.8 per cent had palpable epitrochlears and of the 77 who failed to react, 30 per cent showed enlargement of these nodes. The children giving positive tuberculin reactions showed a positive D'Espine sign in 48.8 per cent, while only 33.7 per cent of those who did not react showed this sign. These last findings are, therefore, corroboratory of the significance of a positive D'Espine's sign as an accompaniment of tuberculous mediastinal nodes.—*The Tubercular Infection in Childhood, A. R. Cunningham and A. R. Ractliffe, Boston M. & S. J., November 16, 1922, clxxxvii, 691.*

Vital Capacity of Children.—The measurement of the vital capacity of children with certain types of spirometers has given results 10 per cent or more below that obtained on the same subjects with other instruments. The results obtained with those instruments giving low readings exhibit a greater degree of variability. The use of a spirometer not sufficiently sensitive for the measurement of vital capacity of children may account for these discrepancies and variations. Observations on 360 normal children suggest that the height unit may be the most practical body measurement for the relating of the vital capacity of children; not that the absolute correlation is greater than the surface area unit, but rather that the chances for error in the calculations are less and, in practice, will more than offset any fundamental differences there may be in favor of the surface area method. *Conclusions:* 1. A spirometer that offers minimal resistance to the egress of air from the lungs is necessary for measuring the vital capacity of children. 2. The correlation between vital capacity and body height is more intimate than that between vital capacity and surface area or body weight. 3. The vital capacity values obtained from children show a degree of variability about equal to that exhibited by other fairly comparable physiologic variables. Young children give results that are not more variable than those from older ones. 4. Children of small stature exhibit a lower vital capacity per unit of surface area than those of larger stature.—*An Analysis of Some of the Factors of Variability in the Vital Capacity Measurements of Children, D. J. Edwards and May G. Wilson, Arch. Int. Med., November 15, 1922, xxx, 638.*

Infection of Children Exposed to Tuberculosis at Home.—Since 1918 the tuberculosis department of the Board of Health of Christiania has carried out systematic cutaneous tuberculin tests, in addition to the ordinary clinical examinations, of children from tuberculous homes. The period covered was from September, 1918,

to December, 1920, and, of the 500 children examined between ages 0 and 8 and recruited from 310 tuberculous homes, 245 were boys and 255 were girls. None had begun to attend school, and they belonged to homes, mostly of the poor working class, where one or more patients suffering from tuberculosis lived or had lived after the birth of these children. The Pirquet cutaneous test was used with O. T. (100 per cent) containing both human and bovine tuberculin. Control tests were made with glycerine bouillon reduced to the concentration of tuberculin by evaporation to one-tenth of its original volume. A definitely palpable red infiltration about 5 mm. in diameter about the site of inoculation was regarded as a positive reaction. The following table is constructed to show compositely the author's results together with those which he cites from the literature:

Positive tuberculin reactions

AGE	500 CHILDREN IN TUBERCULOUS HOMES (SCHRAM)	168 CHILDREN UNDER GREAT RISK OF INFECTION (SCHRAM)	137 CHILDREN IN TUBERCULOUS HOMES IN BERGEN (DETHLOFF)	187 CHILDREN EXPOSED TO INFECTION IN UPSALA (BERGMAN)	49 CHILDREN IN TUBERCULOUS SURROUNDINGS (POLLAK)	123 CHILDREN IN TUBERCULOUS HOMES in CHRISTIANIA (PRÖLICH)	CHILDREN IN TUBERCULOUS HOMES IN TRONDHJEM (ARNFINSEN) (NUMBER NOT GIVEN)
years	*per cent*	*per cent*	*per cent*	*per cent*	*per cent*	*per cent*	*per cent*
0–1	53.1	67.5	14.29	28.6	95.9		
1–2	58.3	76.7	47.37	27.8			
2–3	67.2	83.3	56.25	40.0			
3–4	58.2	63.0	61.11	50.0			
4–5	64.0	68.0	57.14	50.0			
5–6	58.7	78.9	81.82	42.9			
6–7	66.7	100.0	82.61	53.8			
7–8	80.0	100.0	77.27	71.0			
School age					(All aged six months to one year)	95.1	66.9

In the first column it is seen that 53.1 per cent of the author's series of children in the first year of life had already become infected. During the following years the number of infections grows irregularly and gradually; of the total 500 children observed, 300 or 60 per cent proved to be infected. (Dethloff's comparatively low figures for the 0-1 age period, as shown in the table, may be accounted for by the fact that she tested a group of only 14 children of this age while Schram tested 113; other factors such as housing conditions and danger of infection may have entered, although the technique of the test was similar.) Further investigation showed that children are more often infected in homes where a patient has, or has had, tubercle bacilli in the sputum than in homes where the patient is sputum-negative; the percentages of positive tuberculin reactions for these two groups were 69.4 and 50, respectively. A group of children were selected from homes where most of the patients were unfit for work, were at home and partially bedridden, being subjects of advanced phthisis; here the danger of infection was greatest. A comparison of the first and second columns shows a considerable difference in disfavor of the children in such homes. The position in the family of the source of infection affected to a certain extent the tuberculin reactions in children. If the patient was a father, mother, sister or brother, the risk proved to be about equal, but in case it was a more distant relative or a lodger the incidence of infection was comparatively small. One hundred and sixty, or 51.6 per cent, of the 310 tuberculous homes investigated were overcrowded (more than 2 persons to a room), while in the general population of Christiania in 1913–1914 only 24.86 per cent of 10,332 small homes were found to be overcrowded. The tuberculin reactions were about the same in breastfed and bottlefed children. But in children under one year with tuberculous mothers the figures suggest that breast-feeding protects the infant against tuberculous infection quite as well as artificial feeding, and considerably better than mixed feeding when the tuberculous mother remains at home and attends her child. Sixty-eight or 22.7 per cent of the children giving a positive tuberculin reaction showed clinical signs of tuberculosis. On December 31, 1920, a census was taken to discover the fate of the children; 433 were apparently well, 25 were sick at home, 14 were in hospitals, 22 were dead, and 6 were not traced. The majority of these in hospitals had manifest tuberculosis. The cause of death in 15 cases was tuberculosis, and the most frequent cause was tuberculous meningitis. Of all the children examined those under the age of 1 year showed the greatest mortality. It is concluded that children living under the conditions outlined run a great risk of infection and that precautions should be taken to avoid massive infection.—*What Are the Dangers of Infection for Children under Eight in Tuberculous Homes? T. Schram, Tubercle, September, 1922, iii, 529.*

Artificial Pneumothorax in Children.—The indications for this treatment are the

same in early as in adult life. Of 280 children followed, strictly unilateral pulmonary tuberculosis was found in only 12 cases, or 4 per cent. Seven of these were able to be treated by artificial pneumothorax. The chest puncture must be done with great care, to avoid puncturing the lung. Rapid and marked displacement of the mediastinal soft parts is practically constant, though well-borne by children. Though variable in different subjects, absorption of the gas is quite rapid. Two cases, thought to have received too large insufflations, developed rapid accumulation of fluid. Thoracic deformities are produced quite early. Three times the treatment was followed by the development of a pneumonic process in the sound lung, terminating by resolution. This was considered due to the lighting up of an old undiscovered infection in the supposedly sound lung, or to the transmission of tubercle bacilli from the diseased lung by way of the bronchi. Gradual compression is decidedly preferable to rapid injection of large amounts of gas. In one case, the general condition was improved, but tubercle bacilli persisted in the sputum. In three other cases, the local and general results were excellent, and apparently permanent.—*Contribution à l'étude du pneumothorax artificiel chez l'enfant, L. Babonneix and L. Denoyelle, Arch. de Méd. des Enf., October, 1922, xxv, 599.*

Artificial Pneumothorax in Children.—The indications for operation are rare on account of the rapid evolution, frequent bilateral localization, and mediastinal delicacy which permits, even up to fifteen years, extreme displacements of the heart and diaphragm, and prevents complete compression of the lung. In 220 children the operation was considered only 13 times; 8 attempts were made of which only four were successful. Of these 4, only 1 is satisfactory at the end of 4 months.—*Le pneumothorax artificiel dans la tuberculose pulmonaire de l'enfant, Pehu, Cordier and Bonafe, Soc. Méd. des Hôp. de Lyon, June 20, 1922, Reported in Presse Méd., July 15, 1922, xxx, 619.*

Treatment of Bone and Joint Tuberculosis in Children.—In this condition it is necessary to treat the affected part locally and to institute measures to improve the patient's general health. Regarding local treatment, the orthopedist first aims to prevent deformity, or correct deformity if it has already occurred and, second, to put the part in the position of physiological rest, then allowing function in so far as the part will tolerate it. Anything the patient can do with the diseased part is not likely to be harmful, and, as fast as the child is able to use that part, it is to be encouraged. Use stimulates circulation and promotes bone repair; the diseased portion will consequently become more instead of less progressive through too great inactivity. The usual hygienic measures should be used to improve the general resistance. Among these, patients should be trained to employ proper diaphragmatic breathing and to acquire proper posture.—*Tuberculosis in Children from the Standpoint of the Orthopedist, J. E. Goldthwait, Boston M. & S. J., September 28, 1922, clxxxvii, 466.*

Prophylaxis of Tuberculosis in Childhood.—Childhood infection, the rule in tuberculosis, can arise as a family infection, street infection (too infrequently given attention), and infection in tuberculosis institutions. Late infection is much less common but cannot be excluded. Tuberculosis runs in three stages: lymph node, metastatic and tissue destroying types. The combat against tuberculosis must be directed against the early stage, thus essensentially against childhood tuberculosis, to prevent, if possible, open tuberculosis. By legislation the prevention of childhood infection and the proper treatment of infected children must be demanded.—*Bekämpfung der Tuberkulose im Kindesalter, Petruschky, Zentralbl. f. Bakt., Orig., February, 1921, lxxxv, 35.*

Complement Fixation for Cattle Tuberculosis.—The sera of 100 animals declared tuberculous were tested with Besredka's antigen; 95 per cent of them gave positive reactions; the results were: 5, negative; 18, +; 30, ++; 47, +++. The strongly positive reactions generally corresponded with severe generalized tuberculosis; the feebly positive reactions were a less reliable indication of the state of the tuberculosis. In 31 healthy animals the reaction was invariably negative.—*La reaction de deviation du complement, au moyen de l'antigène de Besredka appliquee au diagnostic de la tuberculose bovine, Broco-Rousseu, Urbain and Cauchemez, Compt. Rend. Soc. d. Biol., July 16, 1922, lxxxvii, 502.*

Tuberculosis among Dogs and Cats.—During 1913 and 1914, 4683 dogs and 933 cats were sectioned and examined for tuberculosis. In unquestionable cases the diagnosis was made macroscopically, while in questionable cases bacteriological examinations were made. Cultures and inoculation tests were made only in certain cases. Male dogs had a greater incidence of tuberculosis

than females, it being greater at ages eight to ten years. Arranged according to incidence the breeds were terrier, spitz, and dachshund. Inhalation and mouth infections were of equal incidence. Of the 933 sectioned cats, 110 showed tuberculous changes. The females had a greater incidence than the males. The greatest incidence occurred at four to six years, and there was a slight decrease with age increase above this age. The organs of the chest were affected most, in many cases with coincident abdominal organ disease. Miliary tuberculosis of the lungs was common among cats.—*Beitrag zum Vorkommen der Tuberkulose bei Hund und Katze, J. Johannes, Zeitschr. f. Fleisch- u. Milchhyg., 1921, xxxi, 198, Abstract from Centralbl. f. d. ges. Tuberk.-forsch., August, 1921, xvi, 250.*

Turtle Tuberculosis.—Friedmann's vaccine produced a generalized miliary tuberculosis in turtles. After subcutaneous inoculation of the same material into calves, sheep, goats or guinea pigs, no tuberculous changes resulted; but in individual cases there were nonspecific, purulent, retrogressive nodules at the site of injection. The pathogenic properties are strictly specific.—*Zur Frage der Schildkrötentuberkulose, R. Machens, Centralbl. f. Bakt., Orig., March, 1921, lxxxvi,* 28.

Spontaneous Tuberculosis in Frog.—In the liver of a frog was found a yellow, ill-defined area, the centre filled with a caseous creamy matter containing acid-fast rods, tinctorially and morphologically resembling tubercle bacilli. A culture was obtained at room temperature. Frogs inoculated with this culture developed a miliary tuberculosis in three to eight weeks. The pure cultures which could again be recovered from the diseased organs had the same appearances and properties as the original culture obtained from the liver. The cultures also grew at 37°C. and such cultures did not possess the power to protect against human tubercle bacilli or the same bacilli.—*Ein Fall von spontaner Froschtuberkulose, Stefanie Lichtenstein, Centralbl. f. Bakt. u. Parasitenk., Orig., November, 1920, lxxxv, 249.*

Relation of Facial Skeleton to Chest in Tuberculosis.—Tuberculous patients were measured by the Hofbauer method (Atmungspathologie und Therapie, Berlin, 1921) of determining the structure of the chest, and serviceable figures were obtained from 67 patients. The values were reduced to a basic standard, according to Hofbauer, so that comparable figures resulted; and, besides this, the relation of the chest circumference (B) to the body size (K), B/K, was determined. Of the 67 cases, 36 had a depressed palate and 31 á high palate. The relation B/K for the depressed palate type averaged 0.51 and for the high palate 0.47. The figures are more striking as follows: Of 36 depressed palate type, 24 showed a $B/K > 0.49$ per cent, while of 31 high palate type only 7 revealed a $B/K > 0.49$. In other words, of 36 depressed palate type, two-thirds had a chest circumference as great as or greater than one-half the body size, while of the 31 high palate type, only a little more than one-fifth had a chest circumference equal to or greater than one-half the body size. The reduced values of the Hofbauer scheme gave a figure which showed that the chest of the high palate type on the average is less deep, and the upper chest aperture is more sloping than in the depressed palate. From these relations the conclusion is to be drawn that the high palate designates a narrower thorax, and one with less depth and more marked sloping upper chest aperture. Narrow-chestedness and *Leptoprosopy* stand in a certain relationship; but it would be wrong to infer that here a relation of cause and effect is displayed, that a restricted nasal breathing in the high palate type occasioned the narrow-chestedness. The studies of Siebenmann and Franke showed that the high palate, as such, in its origin is not associated with the type of nasal breathing, and, from the values obtained from chest circumference in obstructed nasal breathing, this is not dependent upon poor or good nasal respiration. It must also be pointed out that narrow-chestedness in no way can be correlated with the determining rôle in phthisiogenesis, even though this has been frequently cited. Zickgraf found a markedly diminished chest measurement in certain people in whom no tuberculosis was discernible. Blumenfeld's material revealed definitely that among phthisis cases there were numerous patients with good chest measurements. It is concluded, therefore, that a high palate, as well as the asthenic type of chest, is to be attributed to an expression of a hypoplastic skeletal development, and that the latter is based on a hereditary condition to be sought for probably in the endocrine system.—*Über die Beziehungen des Baues des Gesichtsskelettes zu dem Brustkorbes bei Tuberkulösen, F. Blumenfeld, Beitr. z. Klin. d. Tuberk., March, 1922, l. 180.*

Primary and Secondary Tuberculosis of Lungs.—A pathological study of lungs with a view to ascertaining the primary and

secondary foci of the tuberculous infection resulted as follows: There were foci of hard, dry caseous matter, partially or completely calcified. These usually varied in size from that of a cherry to a hemp-seed. They were surrounded by a hard fibrous capsule and occasionally enclosed remains of alveolar structures. These foci were in a great number of cases located at the end of a bronchus or were perforated by one. The bronchus showed caseous changes at the point of contact with the nodule. These nodes were definitely demarcated from the usual soft caseous conglomerate tubercles and bronchi that were filled with caseous material. The above foci were considered primary foci of infection. Another interesting observation was made that numerous foci, apparently aspiration foci, all showing the same changes seen in advanced tuberculosis cases, were found; thus indicating that a thoroughly infected organism reacted toward tuberculous involvement like one which never had been massively infected before, that is, that the immunity factors seem to be in abeyance. It is not the immunity of the patient that is important in this case, but the virulence of the bacillus and the resistance of the patient. Advanced pulmonary tuberculosis must be regarded as a chronic metastatic dissemination of either the primary infection or a subsequent infection as virulent as the primary. Endogenous reinfection, that is, the metastatic dissemination of the bacilli already present in the body is far more important than exogenous reinfection.—*Abheilende tuberkulöse primär und reinfecte und bronchogene Metastasen in der Lunge und ihre Beziehung zur tertiären Lungenphtise, G. Grass, Klin. Wchsnchr., August, 1922, i, 1740.*

Pathology of Miners' Phthisis.—The principal element in the problem of miners' phthisis is that men who are resistant to tuberculosis become susceptible with the development of silicotic fibrosis. Why is silica capable of inducing extensive fibrosis? How does this fibrosis aid the establishment of tuberculosis? In the belief that colloidal silica is a cell poison and that fibrosis brought about by finely divided silica was due to the slow formation in the tissues of silica sol, silica powder and soluble colloidal silica were injected subcutaneously into mice. As the reaction is somewhat delayed, the lesions produced by insoluble silica lend themselves more readily to analysis than those produced by the colloidal silica. The lesion is primarily a destructive one, with an area of coagulative necrosis surrounded by a zone of leucocytes and limited by granulation tissue. In course of time the necrotic tissue is gradually absorbed and the final picture is that of an organizing inflammatory fibrosis. The mouse possesses a high degree of natural immunity to tubercle and even massive doses of bacilli given subcutaneously can be tolerated fairly well. When silica is introduced along with the tubercle bacilli the result is very different. The tissues undergo a considerable degree of necrosis and, in two or three days, the bacilli proliferate abundantly in this coagulum. In a few days more the coagulum is absorbed and the lesion becomes infiltrated with phagocytes which absorb the bacilli with avidity. In the meantime, however, a small dose of bacilli becomes a dose of considerable magnitude which explains the much greater local reaction obtained than when injecting tubercle bacilli alone. In Germany soluble silica has been used in the treatment of tuberculosis. A series of experiments conducted by the authors showed that silica sol circulating in the blood does not materially influence a generalized tuberculosis. It is only when the poison is sufficiently concentrated to form local areas of necrosis that the growth of the tubercle bacillus is promoted. Thus, the abnormal prevalence of tuberculosis among men who are exposed to fine silica dust is thought to be due to the destructive action of silica on cells whereby foci of necrosis are produced in which tubercle can multiply, and to the disorganization of the lymphatic drainage of the lung.—*The Pathology of Miners' Phthisis, W. E. Gye and E. H. Kettle, Lancet, October 21, 1922, ccciii, 855.*